

TABLE 3-1  
ACTUAL AIR EMISSION RATES  
BARGMANN TRUST UNIT BI AND FRANZ UNIT AI May 30 2012 through May 29 2013  
BURLINGTON RESOURCES OIL & GAS COMPANY LP

EPN	FIN	Description	Proposed Allowable Hourly and Annual Emission Rates					
			VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	PM <sub>10</sub> /PM <sub>2.5</sub> (T/yr)	SO <sub>2</sub> (lb/hr)	H <sub>2</sub> S (T/yr)
Normal Operations and Alternative Operating Scenarios								
COMP-01	TK-01, TK-02	Compressor Engine 1	0.88	3.85	7.71	3.53	15.46	0.05
FUG	TK-01, TK-02	Site Fugitives	0.93	4.12	--	--	0.22	0.02
FL-1	TK-03, TK-04	Controlled Condensate Tank Emissions	0.76	2.50	--	--	0.004	0.02
FL-1	TK-05, TK-06	Controlled Slop Tank Emissions	0.17	0.10	--	--	--	--
FL-1	TK-07	Controlled PW Tank Emissions	0.03	0.11	--	--	--	--
FL-1	TK-08, TK-09	Antifreeze Liquid Storage	0.50	0.01	--	--	--	--
TK-AF	TK-LO	Lube Oil/Liquid Storage	0.0002	0.000002	--	--	--	--
TK-SCAV	TK-SCAV	H <sub>2</sub> S Scavenger Liquid Storage	<0.01	<0.01	--	--	--	--
FL-1	TRUCK1	Controlled Condensate and Slop Truck Loading	0.90	0.55	--	--	--	--
FL-1	TRUCK2	Controlled Produced Water Truck Loading	0.01	0.004	--	--	--	--
TRUCK1	TRUCK1	Uncaptured Condensate and Slop Truck Loading	0.60	0.36	--	--	--	--
TRUCK2	TRUCK2	Uncaptured Produced Water Truck Loading	0.01	0.002	--	--	--	--
FL-1	FL-1	Flare Combustion - Normal Operations (pilot, assist, and waste gas)	0.01	0.04	0.66	1.73	1.32	3.49
FL-1	SEP-GAS	Low Pressure Separator Gas to Flare - AOS	--	1.22	--	--	0.03	0.11
FL-1	FL-1	Flare Combustion - AOS (pilot, assist, and waste gas)	--	--	0.73	--	1.46	--
TK-01, TK-02	TK-01, TK-02	Uncontrolled Condensate Tank Standing Loss	4.67	0.41	--	--	--	--
TK-03, TK-04	TK-03, TK-04	Emissions- AOS	--	--	--	--	--	--
TK-05, TK-06	TK-05, TK-06	Uncontrolled Slop Tank Standing Loss Emissions-	0.78	0.07	--	--	--	--
TK-07	TK-07	AOS	--	--	--	--	--	--
TK-08, TK-09	TK-08, TK-09	Uncontrolled PW Tank Standing Loss Emissions- AOS	0.002	0.0001	--	--	--	--
Scheduled Maintenance, Startup and Shutdown Events								
COMP-01-SV	COMP-01-SV	Compressor Engine Starter Vent	13.05	0.34	--	--	--	--
FL-1-MSS	COMP-01-BD	Compressor Engine Blowdown	0.12	0.003	--	--	--	--
FL-1-MSS	FL-1-MSS	Flare Combustion (waste gas)	--	--	0.07	0.002	0.14	0.004
MSS-FUG	MSS-FUG	Miscellaneous MSS Activities	5.72	0.16	--	--	2.74	1.46
Site-Wide Emissions:			** 13.85 **	** 10.17 **	** 20.41 **	** 1.68 **	** 0.22 **	** 0.003 **
								** 0.26 **

Note: Aggregated HAP emissions at the Site will be below 10 tpy.

CALCULATION OF COMPRESSOR ENGINE POTENTIAL TO EMIT

BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013

BURLINGTON RESOURCES OIL & GAS COMPANY LP

EPN	FIN	Description	Type	Engine Ratings		Fuel Consumption (Btu/hp-hr)	Operating Hours (hr/yr)	Pollutant	Emission Factors <sup>a</sup>	Units	Annual	
				Rated Horsepower (hp)	Hours (hr/yr)						Hourly <sup>a</sup>	Annual <sup>b</sup>
COMP-01	COMP-01	Compressor Engine 1	Caterpillar G3408TA Rich Burn NSCR Catalyst AFR Controller	400	7,008	8,760	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	4.00 2.00 0.01941	g/hp-hr g/hp-hr lb/MMBu	3.53 1.76 0.05	15.46 7.71 0.22	
							SO <sub>2</sub> VOC CH <sub>2</sub> O	10 1.00 0.0205	ppm S g/hp-hr lb/MMBu	0.004 0.88 0.06	0.02 3.85 0.26	

<sup>a</sup> The Emission Factors for engine COMP-01 for CO, NO<sub>x</sub> and VOC are based on vendor data and information. The VOC emission factor includes the CH<sub>2</sub>O emission factor from AP-42 because the vendor provided information does not include formaldehyde. An example calculation for hourly CO emissions for EPN COMP-01 follows:

$$CO \text{ (lb/hr)} = (\text{Rated Horsepower, hp})^*(\text{Emission Factor, g/hp-hr})*(1 \text{ lb}/453.59 \text{ g})$$

$$CO \text{ (lb/hr)} = (400 \text{ hp})^*(4,000 \text{ g/hp-hr})*(1 \text{ lb}/453.59 \text{ g})$$

$$= \boxed{3.53} \text{ lb/hr CO}$$

The PM/PM<sub>10</sub> and CH<sub>2</sub>O Emission Factors for EPN COMP-01 are from AP-42 Chapter 3. An example calculation for hourly PM emissions for EPN COMP-01 follows:

$$PM \text{ (lb/hr)} = (\text{Fuel Consumption, Btu}/\text{hp-hr})^*(\text{Rated Horsepower, hp})^*(1 \text{ MMBtu}/10^6 \text{ Btu})^*(\text{Emission Factor, lb/MMBu})$$

$$PM \text{ (lb/hr)} = (7,008 \text{ Btu}/\text{hp-hr})^*(400 \text{ hp})^*(1 \text{ MMBtu}/10^6 \text{ Btu})^*(0.01941 \text{ lb/MMBu})$$

$$= \boxed{0.05} \text{ lb/hr PM}$$

A material balance approach was used to estimate the SO<sub>2</sub> emission rates using the maximum sulfur concentration in the natural gas. H<sub>2</sub>S Scavenger liquids are used to bring the fuel gas H<sub>2</sub>S concentration below 10 ppm S. An example calculation for hourly SO<sub>2</sub> emissions for EPN COMP-01 follows:

$$SO_2 \text{ (lb/hr)} = (\text{Fuel Consumption, Btu}/\text{hp-hr})^*(\text{Rated Horsepower, hp})/(\text{Lower Fuel Heating Value, Btu/scf})^*(\text{Sulfur Content, ppmv})*(\text{1 lb-mol}/379 \text{ scf})*(\text{32.06 lb SO}_2/\text{32.06 lb S})$$

$$SO_2 \text{ (lb/hr)} = (7,008 \text{ Btu}/\text{hp-hr})^*(276 \text{ hp})/(1,235 \text{ Btu/scf})^*(10 \text{ scf}/10^6 \text{ scf/gas})*(32.06 \text{ lb S}/\text{lb-mol})*(64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$= \boxed{0.004} \text{ lb/hr SO}_2$$

<sup>b</sup> An example calculation for annual CO emissions for EPN COMP-01 follows:

$$CO \text{ (T/yr)} = (\text{Hourly PTE, lb/hr})^*(\text{Annual Operating Hours, hr/yr})*(1 \text{ T}/2,000 \text{ lb})$$

$$CO \text{ (T/yr)} = (3.53 \text{ lb/hr})^*(8,760 \text{ hr/yr})*(1 \text{ T}/2,000 \text{ lb})$$

$$= \boxed{15.46} \text{ T/yr CO}$$

**CALCULATION OF SITE FUGITIVES (FIN FUG) POTENTIAL TO EMIT**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

Component	Number of Components	Emission Factors <sup>a</sup> (lb/hr-component)	Annual Operating Hours (hr/yr)	Maximum VOC <sup>a</sup> (wt%)	Maximum H <sub>2</sub> S (wt%)	Reduction Credit <sup>a</sup> (%)	PTE VOC		PTE H <sub>2</sub> S	
							Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)
<b>Valves</b>										
Gas Streams	94	0.00992	8,760	25%	0.02%	0%	0.23	1.02	0.0002	0.001
Light Oil	86	0.0055	8,760	100%	--	0%	0.47	2.07	--	--
Water/Light Oil	99	0.000216	8,760	--	--	0%	0.02	0.09	--	--
<b>Pumps</b>										
Water/Light Oil	2	0.000052	8,760	--	--	0%	0.0001	0.0005	--	--
<b>Compressors</b>										
Gas	1	0.009920	8,760	25%	0.02%	0%	0.01	0.04	0.000002	0.00001
<b>Flanges</b>										
Gas Streams	156	0.00086	8,760	25%	0.02%	0%	0.03	0.15	0.00003	0.0001
Light Oil	77	0.000243	8,760	100%	--	0%	0.02	0.08	--	--
Water/Light Oil	20	0.000006	8,760	--	--	0%	0.0001	0.001	--	--
<b>Connectors</b>										
Gas Streams	180	0.00044	8,760	25%	0.02%	0%	0.02	0.09	0.00002	0.0001
Light Oil	179	0.000463	8,760	100%	--	0%	0.08	0.36	--	--
Water/Light Oil	206	0.000243	8,760	--	--	0%	0.05	0.22	--	--
<b>TOTAL:</b>							<b>0.93</b>	<b>4.12</b>	<b>0.0003</b>	<b>0.001</b>

<sup>a</sup> Fugitive Emission Factors and Reduction Credits are per TCEQ Technical Guidance Document for Equipment Leak Fugitives, dated October 2000. The emission factors are for total hydrocarbon, except for the emission factors associated with Water/Light Oil. As indicated on page 6 of 55 in the mentioned Guidance document, these factors are based off of a known stream constituency of 50%-99% water, and remainder VOC. Therefore, applying a VOC wt % would be double counting for the reduction due to water.

<sup>b</sup> Hourly VOC emission rates are calculated as follows:  
 $(94 \text{ components}) * (0.00992 \text{ lb/hr-component}) * (25\% \text{ VOC}) * (100\% - 0\% \text{ reduction credit}) = 0.23 \text{ lb/hr}$

<sup>c</sup> Annual VOC emission rates are calculated as follows:  
 $(94 \text{ components}) * (0.00992 \text{ lb/hr-component}) * (8,760 \text{ hr/yr}) * (25\% \text{ VOC}) * (100\% - 0\% \text{ reduction credit}) / (2,000 \text{ lb/T}) = 1.02 \text{ T/yr}$

**SUMMARY OF TANKS SENT TO FLARE POTENTIAL TO EMIT**  
**BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	VOC Emissions						H <sub>2</sub> S Emissions <sup>c</sup>			
			Hourly (lb/hr)	Annual (Tyr)	Working Breathing Emissions <sup>b</sup> Hourly (lb/hr)	Annual (Tyr)	Uncontrolled Total Hourly (lb/hr)	Annual (Tyr)	Controlled Total <sup>d</sup> Hourly (lb/hr)	Annual (Tyr)	Uncontrolled Total Hourly (lb/hr)	Annual (Tyr)
FL-1	TK-01, TK-02 TK-03, TK-04 TK-05, TK-06	500 bbl Condensate Storage Tanks	21.11	92.46	16.76	32.32	37.87	124.78	0.76	2.50	0.003	0.01
FL-1	TK-07	500 bbl Slop Storage Tank	--	8.38	4.76	8.38	4.76	0.17	0.10	--	--	--
FL-1	TK-08, TK-09	500 bbl Produced Water Storage Tanks	1.26	5.52	0.08	0.03	1.34	5.55	0.03	0.11	0.0002	0.0001
TK-AF <sup>e</sup>	TK-AF <sup>f</sup>	Antifreeze Liquid Storage	--	--	0.50	0.01	0.50	0.01	--	--	--	--
TK-LO <sup>e</sup>	TK-LO <sup>e</sup>	Lube Oil Liquid Storage	--	--	0.0002	0.000002	0.0002	0.000002	--	--	--	--
TK-SCAV <sup>f</sup>	TK-SCAV <sup>f</sup>	H <sub>2</sub> S Scavenger Liquid Storage	--	--	--	--	<0.01	<0.01	--	--	--	--

Notes:  
<sup>a</sup> VOC Flash Emissions are calculated using the WinSim stream simulation program. Data inputs included the pressurized stream data and throughputs represented in this submittal. See the pages at the end of this attachment for a printout of the data inputs and emissions reports.

<sup>b</sup> The Working/Breathing emissions are calculated using AP 4.2 Chapter 7 calculations with data inputs from the stream data and throughputs. See the following pages for the represented calculations.

<sup>c</sup> The Ideal Gas Law was used to estimate the H<sub>2</sub>S emission rates using the maximum sulfur concentration in the gas coming off the tanks (99 ppm). An example calculation for hourly H<sub>2</sub>S emissions from FIN TK-08 and TK-09 follows:

$$\text{H}_2\text{S (lb/hr)} = (\% \text{ Vol H}_2\text{S in stream}) * (\text{Total Volumetric Flow of Gas, scf/hr}) * (1 \text{ atm STP}) * (34.0798 \text{ lb/lb-mol H2S}) / (1.314, atm-scf/lb-mol-K) / (298 \text{ K})$$

$$\text{H}_2\text{S (lb/hr)} = (99 \text{ ppm} / 10^6) * (20.84 \text{ scf/hr}) * (1 \text{ atm}) * (34.0789 \text{ lb/lb mol H2S}) / (1.314, atm-scf/lb-mol-K) / (298 \text{ K})$$

$$\text{H}_2\text{S (lb/hr)} = 0.0002 \text{ lb/hr}$$

<sup>d</sup> All VOC tank emissions are routed to the flare control device with a destruction efficiency of 98%. H<sub>2</sub>S emissions are conservatively represented to be captured at 98% and then 98% converted to SO<sub>2</sub> during combustion, while SO<sub>2</sub> emissions are represented at 100% H<sub>2</sub>S conversion to SO<sub>2</sub>.

<sup>e</sup> Working and breathing emissions for the Antifreeze and Lube Oil tanks were determined using Tanks 4.09d simulation software. The size and number of TK-AF and TK-LO tanks may vary, but the total throughput of the liquid and the associated VOC emissions will not exceed the proposed emission rate. Printouts from the software can be found on the following pages. An example calculation of the hourly emissions for FIN TK-AF follows:

$$\text{VOC(lb/hr)} = [((\text{Breathing Loss, lb/yr}) / (8.760 \text{ hr/yr}) + ((\text{Working Loss, lb/yr}) / (\text{Number of turnovers/yr}) / (\text{Turnovers per hour})))] * \text{No. of tanks}$$

$$\text{VOC(lb/hr)} = (((8.909 \text{ lb/yr}) / (8.760 \text{ hr/yr}) + (5.9832 \text{ lb/yr}) / (12 turnovers/yr) / (1 turnover per hour))) * (1 \text{ Tank})$$

$$\text{VOC(lb/hr)} = 0.50 \text{ lb/hr}$$

An example calculation of the annual emissions for FIN TK-AF follows:

$$\text{VOC(Tyr)} = (\text{Working Loss, lb/yr} + (\text{Breathing Loss, lb/yr}) / (2,000 \text{ ton/yr})) * \text{No. of Tanks}$$

$$\text{VOC(Tyr)} = (5.9832 \text{ lb/yr} + 8.909 \text{ lb/yr}) / (2,000 \text{ ton/yr}) * 1 \text{ Tank}$$

$$\text{VOC(Tyr)} = 0.01 \text{ lb/hr}$$

<sup>f</sup> The size and number of the H<sub>2</sub>S Scavenger Liquid Storage Tanks may vary, but the total throughput of the liquid and the associated VOC emissions will not exceed the proposed negligible emission rate.

CALCULATION OF STORAGE TANK WORKING AND BREATHING POTENTIAL TO EMIT  
 BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 MAY 30 2012 through May 29 2013  
 BURLINGTON RESOURCES OIL & GAS COMPANY LP

Variable	Description	Units	Value
$L_T$	Total loss = $L_S + L_W$	Tonyr	See Table
$L_S$	standing loss = 65 Vw Kw Ks	Ib/yr	See Table
$L_W$	working loss = 0.0011 Nv Pv Q Ki Kp	Ib/yr	See Table
$L_H$	working loss = 0.0011 Nv Pv Qs Qh	Ib/hr	See Table
Root Construction		Cone	
Rv/P	Condensate Reid Vapor Pressure	psia	11.64
$\Delta P_b$	Breather vent pressure range	psi	0.06
$\Delta P_b$	Solar insulation factor	Btu/(2-day)	1521
$P_a$	Atmospheric pressure	psia	14.7
$M_v$	Vapor Molecular Weight	lb/mol	36
T	Average Temperature	°F	72.1
$T_{ax}$	Daily Maximum Ambient Temperature	°R	541.6
$T_{aw}$	Daily Minimum Ambient Temperature	°R	522.5
$\Delta T_A$	Daily average ambient temperature range	°R	19.1
Kp	Product factor		1

Tank Specifications										Material Specifications										VOC					
	VH	D	Ht	Capacity	Color	a	Mv	B <sub>Max</sub>	Q <sup>2</sup>	ΔV <sub>v</sub>	H <sub>vo</sub>	W <sub>v</sub>	R <sub>a</sub>	T <sub>la</sub>	W <sub>v</sub>	ΔP <sub>v</sub>	K <sub>e</sub>	K <sub>n</sub>	K <sub>s</sub>	K <sub>w</sub>	L <sub>w</sub>	L <sub>t</sub>	L <sub>f</sub>		
Material	No. of Tanks	Tank Type	Tank Diameter (ft)	Tank Capacity (bbl)	Paint Color	Paint Absorbance Factor	Paint Solar Conditions	Reid Vapor Pressure (psia)	Max. Hourly Throughput (bbl/hr)	Annual throughput (bbl)	Daily Vapor Temp. Range °F	Vapor Space Volume (ft <sup>3</sup> )	Daily Average Liquid Surface Temp °R	Vapor Density (lb/ft <sup>3</sup> )	Vapor Pressure (psia)	Vapor Expansion Factor	Vapor Sat. Factor	Turnover Factor	Standing Loss (bbl)	Working Loss (bbl)	Total Loss (bbl)	Total Loss (Troy)			
Condensate	6	V	12	25	500	Gray	Good	0.54	36	229,050	36.75	12,63	1428.4	539.8	12.454	0.07740	3.35852	0.11	0.23	40,928.19	23,712.24	16.76	32.32		
Slip	1	V	12	25	500	Gray	Good	0.54	36	11,64	20	6,000	36.75	12,63	1428.4	539.8	12.454	0.07740	3.35852	0.11	1.00	6,821.37	2,680.06	8.38	4.76
PV	2	V	12	25	500	Gray	Good	0.54	36	0.116	20	146,000	36.75	12,63	1428.4	539.8	0.033	0.00021	0.00656	0.098	0.27	14.21	46.93	0.98	0.03

NOTE: Tank working and breathing emissions are based on the equations found in EPA AP 42 Chapter 7. All factors used are represented in the table on this page. The Condensate Reid Vapor Pressure and Vapor Molecular Weight are determined based on the WinSim condensate stream and Off Gas stream. All other variables are found in AP 42 Chapter 7 or are default unit values.

## CALCULATION OF TRUCK LOADING POTENTIAL TO EMIT

BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013

## BURLINGTON RESOURCES OIL & GAS COMPANY LP

Sample Calculations for condensate:

$$\text{Loading Loss (lb/Mgal)} = 12.46 * S * P * M / T (\text{AP-42 Section 5.2})$$

$$\text{Maximum Loading Loss} = 12.46 * 0.60 * 11.640 * 36 / 560 = 5.594 \text{ lb/Mgal}$$

$$\text{Hourly Uncollected Emissions PTE} = (\text{Hourly Throughput, Mgal/hr}) * (\text{Maximum Loading Loss, lb/Mgal}) * (1 - \text{Capture Efficiency})$$

$$\text{Hourly Uncollected Emissions PTE} = (8.19 \text{ Mgal/yr}) * (5.594 \text{ lb/Mgal}) * (1 - 0.987) = 0.60 \text{ lb/hr}$$

$$\text{Hourly PTE} = ((\text{Hourly Throughput, Mgal/hr}) * (\text{Maximum Loading Loss, lb/Mgal}) * (\text{Capture Efficiency}) * (1 - \text{Destruction Efficiency}))$$

$$\text{Hourly PTE} = (8.19 \text{ Mgal/hr}) * (5.594 \text{ lb/Mgal}) * (0.987) * (1 - 0.98) = 0.90 \text{ lb/hr}$$

$$\text{Annual Emissions} = ((\text{Annual Throughput, Mgal/yr}) * (\text{Average Loading Loss, lb/Mgal}) * (\text{Capture Efficiency}) * (1 - \text{Destruction Efficiency})) / (2000 \text{ lb/T})$$

$$\text{Annual Emissions} = (9909.90 \text{ Mgal/yr}) * (5.587 \text{ lb/Mgal}) * (0.987) * (1 - 0.98) / (2000 \text{ lb/T}) = 0.55 \text{ T/yr}$$

FIN	EPN	Facility Name	S	P @ 560 R (psia)	P @ 531.7 R (psia)	M	Maximum Loading Loss (lb/Mgal)	Average Loading Loss (lb/Mgal)	Hourly Throughput (Mgal/hr)	Annual Throughput (Mgal/yr)	Capture Efficiency	Hourly Uncollected Loading Emissions (lb/hr)	Annual Uncollected Loading Emissions (T/yr)	Captured and Controlled Total VOC	
														Uncaptured Total VOC	Captured and Controlled Total VOC
TRUCK1	FL-1/ TRUCK1	Condensate and Slop Truck Loading	0.60	11.64	11.038	36	5.594	5.587	8.19	9,909.90	0.987	0.60	0.36	0.98	0.90
TRUCK2	FL-1/ TRUCK2	Produced Water Truck Loading	0.60	0.12	0.026	36	0.058	0.061	8.19	6,132.00	0.987	0.01	0.002	0.98	0.01

Daily maximum and daily minimum ambient temperature from Tanks 4.09d (for this area's annual averages (81.6 and 62.5, for average of 72.1).

Annual Average Condensate and Slop Vapor Pressure at  $T_{LA}$ :

$$P = \exp \{ [ (2799 / (T-459.6) - 2.227 / \log(10(RVP)) - 726) / (T-459.6) + 12.82 ] \\ \exp \{ [ (2799 / (72.1-459.6) - 2.227 / \log(10(11.64)) - 726) / (72.1-459.6) + 12.82 ] \\ 11.038 \text{ psia} \}$$

Annual Average Produced Water Vapor Pressure at  $T_{LA}$ :

$$P = \exp \{ [ (2799 / (T-459.6) - 2.227 / \log(10(RVP)) - 726) / (T-459.6) + 12.82 ] \\ \exp \{ [ (2799 / (72.1-459.6) - 2.227 / \log(10(11.64*0.01)) - 726) / (72.1-459.6) + 12.82 ] \\ 0.026 \text{ psia} \}$$

NOTE: Capture Efficiency of 98.7% represented based upon TCEQ Guidance regarding trucks that are utilizing NSPS XX Testing.

**SUMMARY OF PROCESS FLARE FUEL GAS COMBUSTION AND  
WASTE GAS COMBUSTION POTENTIAL TO EMIT. NORMAL OPERATIONS AND ALTERNATIVE OPERATING SCENARIOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	VOC		NO <sub>x</sub>		CO		SO <sub>2</sub>		H <sub>2</sub> S	
			(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
FL-1	FL-1	Pilot Gas Combustion	0.0001	0.0004	0.003	0.01	0.01	0.04	0.0003	0.001	0.000001	0.000004
FL-1	FL-1	Flare Assist Gas Combustion	0.01	0.04	0.22	0.96	0.44	1.93	0.02	0.09	0.00001	0.00004
FL-1	FL-1	Waste Gas Combustion- Normal Operations	--	--	0.44	0.76	0.87	1.52	0.006	0.02	0.0001	0.0002
		Normal Operations Total:	<b>0.01</b>	<b>0.04</b>	<b>0.66</b>	<b>1.73</b>	<b>1.32</b>	<b>3.49</b>	<b>0.03</b>	<b>0.11</b>	<b>0.0001</b>	<b>0.0002</b>
FL-1	FL-1	Waste Gas Combustion - ACS	--	--	--	0.73	--	1.46	--	0.09	--	0.0010
		Alternative Operating Scenarios Total:	--	--	--	<b>0.73</b>	--	<b>1.46</b>	--	<b>0.09</b>	--	<b>0.0010</b>

CALCULATION OF FLARE PILOT GAS and FLARE ASSIST GAS POTENTIAL TO EMIT - NORMAL AND AOS  
 BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013  
 BURLINGTON RESOURCES OIL & GAS COMPANY LP

EPN	FIN	Description	LHV (Btu/scf)	Heat Release scf/hr	Operating Hours (hr/yr)	Pollutant	Emission Factors	Units	Emission Rates	
									Hourly <sup>a</sup> (lb/hr)	Annual <sup>b</sup> (T/yr)
FL-1	FL-1	Flare 1- Process Pilot Combustion	1,292	15	8,760	CO NO <sub>x</sub>	0.2755 0.138	lb/MMBtu lb/MMBtu	0.01 0.003	0.04 0.01
						PM/PM <sub>10</sub> /PM <sub>2.5</sub>	-- <sup>c</sup>	--	--	--
						SO <sub>2</sub>	99	ppm H <sub>2</sub> S	0.0003	0.001
						H <sub>2</sub> S	99	ppm H <sub>2</sub> S	0.000001	0.000004
						VOC	5.5	lb/MMscf	0.0001	0.0004
FL-1	FL-1	Flare 1- Process Flare Assist Gas Combustion	1,292	1,250	8,760	CO NO <sub>x</sub>	0.2755 0.138	lb/MMBtu lb/MMBtu	0.44 0.22	1.93 0.96
						PM/PM <sub>10</sub> /PM <sub>2.5</sub>	-- <sup>c</sup>	--	--	--
						SO <sub>2</sub>	99	ppm H <sub>2</sub> S	0.02	0.09
						H <sub>2</sub> S	99	ppm H <sub>2</sub> S	0.0001	0.00004
						VOC	5.5	lb/MMscf	0.01	0.04

<sup>a</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Heat Release, scf/hr}) * (\text{Lower Heating Value, Btu/scf}) * (\text{MM}/10^6)^*(\text{Emission Factor, lb/MMBtu}) \\ \text{CO (lb/hr)} &= (15 \text{ scf/hr}) * (1,292 \text{ Btu/scf}) * (\text{MM}/10^6)^*(0.2755 \text{ lb/MMBtu}) \\ &= \boxed{0.01 \text{ lb/hr CO}} \end{aligned}$$

The Emission Factors for SO<sub>2</sub> and VOC were based upon AP-42 Table 1.4-2 (dated 7/98). An example calculation for hourly VOC emissions for EPN FL-1 follows:

$$\begin{aligned} \text{VOC (lb/hr)} &= (\text{Heat Release, scf/hr}) * (\text{MM}/10^6)^*(\text{Emission Factor, lb/MMscf}) \\ \text{VOC (lb/hr)} &= (15 \text{ scf/hr}) * (\text{MM}/10^6)^*(5.5 \text{ lb/MMscf}) \\ &= \boxed{0.0001 \text{ lb/hr VOC}} \end{aligned}$$

A material balance approach was used to estimate the SO<sub>2</sub> and H<sub>2</sub>S emission rates using the max sulfur concentration in the natural gas. As shown in Figure 6-1, H<sub>2</sub>S concentration at the site is conservatively represented at 099 ppm. To be conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for the pilot gas of EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= \text{Heat Release (scf/hr)} * (\text{Sulfur Content, ppm})^*(100\% \text{ conversion to SO}_2)^*(1 \text{ lb-mol}/379 \text{ scf})^*(34.065 \text{ lb H}_2\text{S/lb-mol})^*(64.06 \text{ lb SO}_2/34.065 \text{ lb H}_2\text{S}) \\ \text{SO}_2 \text{ (lb/hr)} &= (15 \text{ scf/hr}) * (99 \text{ ppm H}_2\text{S}) / 1096 \text{ scf gas})^*(1 \text{ lb-mol}/379 \text{ scf})^*(100\% \text{ converted to SO}_2)^*(34.065 \text{ lb H}_2\text{S/lb-mol})^*(64.06 \text{ lb SO}_2/34.065 \text{ lb H}_2\text{S}) \\ &= \boxed{0.0003 \text{ lb/hr SO}_2} \end{aligned}$$

<sup>b</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (T/yr)} &= (\text{Hourly Emissions, lb/hr})^*(\text{Annual Operating Hours, hr/yr})^*(1 \text{ T/2,000 lb}) \\ \text{CO (T/yr)} &= (0.01 \text{ lb/hr})^*(3,760 \text{ hr/yr})^*(1 \text{ T/2,000 lb}) \\ \text{CO (T/yr)} &= \boxed{0.04 \text{ T/yr CO}} \end{aligned}$$

<sup>c</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - NORMAL OPERATIONS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	LHV <sup>a</sup> (Btu/scf)	Waste Gas Flow Rate		Emission Factors	Units	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (Tyr)
				Hourly (MMBw/hr)	Annual (MMBtu/yr)				
FL-1	FL-1	Process Flare Condensate and Slop Tanks and Loading	1,890	3.09	10,649.13	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.85 0.43 --
FL-1	FL-1	Process Flare Produced Water Tank and Loading	1,869	0.07	387.32	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.05 0.03 --

<sup>a</sup> Waste gas stream lower heating value was taken from WinSim calculated stream value.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Hourly Waste Gas Flow Rate, MMBw/hr}) * (\text{Emission Factor, lb/MMBtu}) \\ \text{CO (lb/hr)} &= (3.09 \text{ MMBw/hr}) * (0.2755 \text{ lb/MMBtu}) \\ &= \boxed{0.85 \text{ lb/hr CO}} \end{aligned}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the tanks to the flare and from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= (\text{Source H}_2\text{S Emission Rate, lb/hr}) * (98\% \text{ captured H}_2\text{S stream}) * (100\% \text{ conversion to SO}_2 \text{ at combustion}) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ \text{SO}_2 \text{ (lb/hr)} &= (0.003 \text{ lb/hr H}_2\text{S}) * (98\%) * (100\%) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ &= \boxed{0.006 \text{ lb/hr SO}_2} \end{aligned}$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (Tyr)} &= (\text{Annual Waste Gas Flow Rate, MMBw/yr}) * (\text{Emission Factor, lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb}) \\ \text{CO (Tyr)} &= (10,649.13 \text{ MMBw/yr}) * (0.2755 \text{ lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb}) \\ &= \boxed{1.47 \text{ T yr CO}} \end{aligned}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM FINs TK-01 THROUGH TK-03, TK-05, and TRUCK1**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**TK-01 through TK-03, TK-05, and TRUCK1 Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	91.25
VOC Emissions (TPY):	157.04
Hydrocarbon Emissions (lb/hr):	146.33
Hydrocarbon Emissions (TPY):	251.83

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Condensate Tanks Flash Gas Weight (%)	TK-01 through TK-03, TK-05 and TRUCK1 Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	13.26%	19.40	33.39	0.46	1,577.50
Ethane	22,304	22.39%	32.76	56.38	0.72	2,489.85
Propane	21,646	24.11%	35.28	60.72	0.76	2,602.40
I-Butane	21,242	7.38%	10.80	18.59	0.22	773.98
N-Butane	21,293	13.05%	19.10	32.86	0.40	1,371.39
I-Pentane	21,025	5.39%	7.89	13.57	0.16	559.21
N-Pentane	21,072	4.61%	6.75	11.61	0.14	479.51
Cyclopentane	20,350	0.31%	0.45	0.78	0.01	31.11
n-Hexane	20,928	1.51%	2.21	3.80	0.05	155.87
Cyclohexane	20,195	0.34%	0.50	0.86	0.01	34.04
Other Hexanes	20,928	2.78%	4.07	7.00	0.08	287.13
Heptanes	20,825	1.47%	2.15	3.70	0.04	151.02
Octanes	20,747	0.48%	0.70	1.21	0.01	49.20
Nonanes	20,687	0.13%	0.19	0.33	0.004	13.38
Decanes Plus	20,638	0.07%	0.10	0.18	0.002	7.28
Benzene	18,172	0.19%	0.28	0.48	0.005	17.10
Toluene	18,422	0.33%	0.48	0.83	0.01	29.97
Ethylbenzene	18,658	0.03%	0.04	0.08	0.001	2.93
Xylene	18,438	0.18%	0.26	0.45	0.005	16.26
VOC		62.36%				
					<b>Total:</b>	<b>3.09</b>
						<b>10,649.13</b>

<sup>a</sup> Total VOC Emissions were determined by adding the Uncontrolled Streams for FIN TK-01 through TK-03 and TK-05 on the Tank Summary table with the uncontrolled emissions from the Condensate Truck Loading. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (91.25 \text{ lb/hr}) * (1 / 62.36\%)$$

$$\text{Total HC (lb/hr)} = 146.33 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Condensate Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (19.40 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.46 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (33.39 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 1,577.50 \text{ MMBtu/yr}$$

**CALCULATION OF FLARE FEED RATES FROM FIN TK-04 and TRUCK2**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**TK-04 and TRUCK2 Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	1.84
VOC Emissions (TPY):	5.75
Hydrocarbon Emissions (lb/hr):	2.94
Hydrocarbon Emissions (TPY):	9.18

<b>Constituent</b>	<b>Heating Value<sup>b</sup> (Btu/lb)</b>	<b>Produced Water Tanks Flash Gas Weight (%)</b>	<b>TK-04 and TRUCK2 Emissions<sup>c</sup></b>		<b>Flare Feed Rate<sup>d</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	12.96%	0.38	1.19	0.01	56.22
Ethane	22,304	22.15%	0.65	2.03	0.01	89.65
Propane	21,646	24.03%	0.71	2.21	0.02	94.72
I-Butane	21,242	7.46%	0.22	0.68	0.005	28.31
N-Butane	21,293	13.18%	0.39	1.21	0.01	50.50
I-Pentane	21,025	5.44%	0.16	0.50	0.003	20.60
N-Pentane	21,072	4.65%	0.14	0.43	0.003	17.76
Cyclopentane	20,350	0.32%	0.01	0.03	0.0002	1.20
n-Hexane	20,928	1.52%	0.04	0.14	0.001	5.74
Cyclohexane	20,195	0.34%	0.01	0.03	0.0002	1.19
Other Hexanes	20,928	2.81%	0.08	0.26	0.002	10.66
Heptanes	20,825	1.48%	0.04	0.14	0.001	5.71
Octanes	20,747	0.48%	0.01	0.04	0.0002	1.63
Nonanes	20,687	0.13%	0.004	0.01	0.0001	0.41
Decanes Plus	20,638	0.08%	0.002	0.01	0.00004	0.40
Benzene	18,172	0.19%	0.01	0.02	0.0002	0.71
Toluene	18,422	0.33%	0.01	0.03	0.0002	1.08
Ethylbenzene	18,658	0.03%	0.001	0.003	0.00002	0.11
Xylene	18,438	0.18%	0.01	0.02	0.0002	0.72
<b>VOC</b>		<b>62.65%</b>				
					<b>Total: 0.07</b>	<b>387.32</b>

<sup>a</sup> Total VOC Emissions were determined by adding the Uncontrolled Streams for FIN TK-04 on the Tank Summary table and the uncontrolled emissions associated with the produced water loading, FIN TRUCK2. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1/\text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (1.84 \text{ lb/hr}) * (1/ 62.65\%)$$

$$\text{Total HC (lb/hr)} = 2.94 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Produced Water Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (0.38 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.01 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (1.19 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 56.22 \text{ MMBtu/yr}$$

CALCULATION OF SEPARATOR GAS ROUTED TO FLARE POTENTIAL TO EMIT - AOS

BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013

BURLINGTON RESOURCES OIL & GAS COMPANY LP

Facility Identification Number (FIN)	Gas Volume Sent to Flare (MSCF/yr)	Gas Stream Molecular Weight (lb/lb-mol)	Max VOC Percentage in Gas (wt%)	Max H <sub>2</sub> S Percentage in Gas (wt%)	Potential to Emit (PTE)	
					VOC	H <sub>2</sub> S
SEP-GAS	8,493	21.77	25%	0.02%	98%	--
					1.22	--
						0.0010

<sup>a</sup> During engine maintenance at other downstream sites, the low pressure separator gas at this site may be routed to flare 5% of the year.

<sup>b</sup> Hourly VOC emission rates are calculated as follows:

(Gas Throughput, MSCF/hr) / (379 scf/lb-mol) \* (Gas Stream MW, lb/lb-mol) \* (Maximum VOC Percentage in Gas) \* (Destruction Efficiency on Flare) = (VOC Emissions, lb/hr)  
#REF!

<sup>c</sup> Annual VOC emission rates are calculated as follows:  
(Gas Throughput at Site, MSCF/yr) / (379 scf/lb-mol) \* (Gas Stream MW, lb/lb-mol) \* (Max VOC Percentage in Gas) \* (Destruction Efficiency on Flare) \* (1000 scf/Mscf) / (2000 l  
(08,493 MSCF/yr) / (379 scf/lb-mol) \* (21.77 lb/lb-mol) \* (25%) \* (100% - 98%) \* (1000 scf/Mscf) / (2000 lb/T) = 1.22 T/yr

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - AOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	Waste Gas Flow Rate			Emission Factors	Units	Annual <sup>c</sup> Hourly <sup>p</sup> (lb/hr)
			LHV <sup>a</sup> (Btu/scf)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)			
FL-1	FL-1	Process Flare LP Separator Gas to Flare Event	1,235	0.00	10,585.56	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	-- <sup>c</sup> 0.09 0.0010

<sup>a</sup> Waste gas stream lower heating value was taken from inlet gas analysis.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\text{CO (lb/hr)} = (\text{Hourly Waste Gas Flow Rate, MMBtu/hr}) * (\text{Emission Factor, lb/MMBtu})$$

$$\text{CO (lb/hr)} = (0.00 \text{ MMBtu/hr}) * 0.2755 \text{ lb/MMBtu}$$

$$= \boxed{\quad} \text{ -- } \boxed{\quad} \text{ lb/hr CO}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the tanks to the flare and from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\text{SO}_2 \text{ (lb/hr)} = (\text{Source H}_2\text{S Emission Rate, lb/hr}) * (98\% \text{ captured H}_2\text{S stream}) * (100\% \text{ conversion to SO}_2 \text{ at combustion}) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2)$$

$$\text{SO}_2 \text{ (lb/hr)} = \boxed{\quad} \text{ -- } \boxed{\quad} \text{ lb/hr SO}_2$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\text{CO (Tyr)} = (\text{Annual Waste Gas Flow Rate, MMBtu/yr}) * (\text{Emission Factor, lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb})$$

$$\text{CO (Tyr)} = \boxed{(10,585.56 \text{ MMBtu/yr}) * (0.2755 \text{ lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb)}} \\ = \boxed{1.46 \text{ Tyr CO}}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM LP SEPARATOR - AOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Max BD Volume (Mscf/hr)</b>	#REF!
<b>Max BD Volume (Mscf/yr)</b>	8,493
<b>Gas Density (lb/scf)</b>	0.0577

<b>Constituent</b>	<b>Heating Value<sup>a</sup> (Btu/lb)</b>	<b>Inlet Gas Weight (%)</b>	<b>Separator BD Emissions<sup>b</sup></b>		<b>Flare Feed Rate<sup>c</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	55.89%	--	136.94	--	6,469.70
Ethane	22,304	17.53%	--	42.95	--	1,896.75
Propane	21,646	10.53%	--	25.80	--	1,105.76
I-Butane	21,242	2.59%	--	6.35	--	264.38
N-Butane	21,293	3.98%	--	9.75	--	406.91
I-Pentane	21,025	1.49%	--	3.65	--	150.41
N-Pentane	21,072	1.19%	--	2.92	--	120.60
Cyclopentane	20,350	0.00%	--	0.00	--	0.00
n-Hexane	20,928	1.70%	--	4.17	--	171.05
Cyclohexane	20,195	0.00%	--	0.00	--	0.00
Other Hexanes	20,928	0.00%	--	0.00	--	0.00
Heptanes	20,825	0.00%	--	0.00	--	0.00
Octanes	20,747	0.00%	--	0.00	--	0.00
Nonanes	20,687	0.00%	--	0.00	--	0.00
Decanes Plus	20,638	0.00%	--	0.00	--	0.00
Benzene	18,172	0.00%	--	0.00	--	0.00
Toluene	18,422	0.00%	--	0.00	--	0.00
Ethylbenzene	18,658	0.00%	--	0.00	--	0.00
Xylene	18,438	0.00%	--	0.00	--	0.00
			<b>Totals:</b>	<b>0.00</b>	<b>10,585.56</b>	

<sup>a</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>b</sup> Constituent Emission Rates were calculated from the known maximum blowdown volumes and density then proportioned using the Inlet Gas stream constituents weight percents. An example calculation for Methane emissions is as follows:

$$\begin{aligned} \text{Methane (lb/hr)} &= \text{Maximum BD Volume (Mscf/hr)} * \text{Gas Density (lb/scf)} * \text{Inlet Gas Weight \%} * 1000 \\ \text{Methane (lb/hr)} &= \#REF! \\ \text{Methane (lb/hr)} &= -- \quad \text{lb/hr} \end{aligned}$$

<sup>c</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\begin{aligned} \text{MMBtu/hr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/hr Methane} &= (23,861 \text{ Btu/lb}) * (-\text{lb/hr}) * 99\% / (10^6) \\ \text{MMBtu/hr Methane} &= -- \quad \text{MMBtu/hr} \end{aligned}$$

An example calculation for the annual flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\begin{aligned} \text{MMBtu/yr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/yr Methane} &= (23,861 \text{ Btu/lb}) * (136.94 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6) \\ \text{MMBtu/yr Methane} &= 6,469.70 \text{ MMBtu/yr} \end{aligned}$$

CALCULATION OF STORAGE TANK WORKING AND BREATHING POTENTIAL TO EMIT DURING FLARE DOWNTIME - AOS  
 BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 May 30 2012 through May 29 2013  
 BURLINGTON RESOURCES OIL & GAS COMPANY LLP

Variable	Description	Units	Value
$L_T$	total loss = $L_S + L_W$	Ton/yr	See Table
$L_S$	standing loss = $365 Vv Wv Ks Ks$	lb/yr	See Table
$L_W$	working loss = $0.001 Mv Pv Qv Kn Kp$	lb/yr	See Table
$L_u$	working loss = $0.001 Mv Pvmax Qh$	lb/hr	See Table
Roof Construction	Cone		
RVP	Condensate Reid Vapor Pressure	psia	11.64
$\Delta P_b$	Breather vent pressure range	psi	0.06
$I$	Solar insulation factor	Btuft <sup>2</sup> /day	1521
$P_A$	Atmospheric Pressure	psia	14.7
Mv	Vapor Molecular Weight	lb/lbmol	36
T	Annual Average Temperature	°F	72.1
$T_{AX}$	Daily Maximum Ambient Temperature	°R	541.6
$T_{AN}$	Daily Minimum Ambient Temperature	°R	522.5
$\Delta T_A$	Daily average ambient temperature range	°R	19.1
Kp	Product factor		1

Tank Specifications				Material Specifications										VOC							
	V/H	D	H/L	Capacity	Color	$\alpha$	Mv	$Q^*$	$P_{Max}$	$\Delta T_v$	Hvo	$T_{La}$	$P_{vA}$	Wv	$\Delta Pv$	Ke	Ks	Ls	$L_r$	LH	
Material	No. of Tanks	Tank Type	Tank Diameter (ft)	Tank Height/Length (ft)	Tank Capacity (bbl)	Paint Color Conditions	Paint	Paint Solar Absorbance Factor	Reid Vapor Pressure (psia)	Max. Hourly Storage (bbl/hr)	Daily Vapor Space Outage Temp. Range °F	Average Liquid Surface Temp °R	Vapor Pressure (psia)	Vapor Density (lb/ft <sup>3</sup> )	Daily Vapor Pressure Range	Vapor Space Expn. Factor	Vented Sat. Vapor Sat. Factor	Standing Loss (lb/yr)	Total Loss (lb/yr)	Total Loss (T/hr)	
Condensate	6	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	12.454	0.07740	3.35852	1.5367	0.11	818.56	4.67
Slip	1	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	12.454	0.07740	3.35852	1.5367	0.11	818.56	4.67
Pv	2	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	0.033	0.00021	0.02056	0.0652	0.98	0.28	0.002
																					0.0001

NOTE: Tank working and breathing emissions are based on the equations found in EPA AP-42 Chapter 7. All factors used are represented in the table on this page. The Condensate Reid Vapor Pressure and Vapor Molecular Weight are determined based on the WinSim condensate stream and Off Gas stream. All other variables are found in AP-42 Chapter 7 or are default unit values.

The emissions shown are due to flare maintenance occurring 2% of the year. During the flare downtime the wellhead would be shut in. Therefore there would be no condensate or produced water liquids flowing to the tanks, however any liquid already in the tanks would remain and have breathing (standing losses) emissions. These emissions would not be controlled, as the flare is down for maintenance. The calculations shown demonstrate this alternative operating scenario regarding flare maintenance and downtime. Based on 2% downtime, this scenario is being shown to occur for 175.2 hours in a year.

As shown on the summary page representing the Tank Emission sent to Flare, HS emissions are represented as occurring when the liquid streams flush during the change from a pressurized flow to the atmospheric tank. Due to the chemical properties of HS, the most conservative approach is to represent that all H<sub>2</sub>S in the liquid will immediately flash, and there will be no HS emitted during working and breathing while the liquids are stored. Since there will be no liquid flow during the flare downtime, there are no flash emissions and therefore no HS emissions from the standing loss of the tanks.

**EMISSIONS FOR MISCELLANEOUS ACTIVITIES (F1N/MSS-FUG)**  
**BARGMANN TRUSTUNI BLAND FRANZ UNIT A1** May 30 2012 through May 29 2013  
**BURLINGTON RESOURCES OIL & GAS COMPANY L.P.**

Emissions Summary			
Pollutant	Hourly Max (lb/hr)	Annual Total (T/yr)	
VOC	5.72	0.16	
H <sub>2</sub> S	0.0004	0.00002	
PM	2.21	1.18	
PM10	0.53	0.28	
PM2.5	0.0001	0.000003	

#	Activity	Description / Comments	Default Parameters	Equation Used	Input Parameters	Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)	Source for "Input Parameters"
1	(b)(1) Engine/Turbine Oil Changes	-Engine has been isolated and blow down occurs prior to oil change. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -The emissions associated with the blow down occur during the draining of the oil filter. -Oil is drained into a 4 ft x 4 ft open pan and transferred to a closed container per Best Management Practice (BMP). -Input parameters based on manufacturer specifications of engine oil SAE 10W (a). -Used a 1380 hp Caterpillar G3516B LE engine (b) as basis for calculation. In order to account for emissions from larger horse power engines, the emissions are doubled. An average engine uses 1.1 gallons of motor oil and manufacturer recommends changing oil every 1000 hrs. We used 10 changes of oil per year as a conservative estimate. -Emission estimates for 1380hp engine are being doubled to be conservative and to accommodate engines with higher hp. -Assume all emissions from opening, loading, and evaporation occur in three separate hours.	Temperature (F) Vapor Pressure (psia) Saturation Factor Molecular Weight (lb/mol) Motor Oil (gal/activity) L <sub>v</sub> winds speed (mph) Vapor Pressure (P <sub>v</sub> , Pa) Molecular Weight (lb/mol) Surface Area A <sub>s</sub> (ft <sup>2</sup> ) (46.4 ft <sup>2</sup> ) Evaporation time (hrs) Number of activities per year (Number of oil changes per engine per year) Factor used to account for larger horsepower engines	212 0.001 1 500 112 3.52 10 500 1.48 10 10 2	Loading Loss L <sub>t</sub> (lb/(1000 gal)) Loading loss per activity (lb/activity) Number of Engines	1 0.009 1	VOC 1.03	0.01	Site-Specific Data
2	(b)(1) & (b)(4) Changing Engine Rod Packings	-Engine has been isolated and blow down occurs prior to changing rod packing. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clingleage are the evaporation of the lubricant adhered to the rod packing casing. -Casing volume for calculations is based on field observation of casing for a 1380hp G3516B LE engine (b). -Input parameters based on material specifications for AP 101(c) grease. -Assume all emissions from maintenance activity occur in one hour.	Temperature (F) Vapor pressure (psia) Molecular weight (lb/mole) V <sub>v</sub> Casing volume (ft <sup>3</sup> ) (1 ft * 3 ft) Ideal loss constant (psi-ft <sup>3</sup> lb <sup>-1</sup> mol <sup>-1</sup> R) Number of activities per year (Number of rod packing changes per year per engine)	104 0.001 500 2.355 10.73 10	Change Loss (lb/activity) Number of Engines	1 0.0001	VOC 0.0001	0.000001	Site-Specific Data
3	(b)(3) Changing Wet and Dry Seals	-Engine has been isolated and blow down occurs prior to changing seals. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clingleage of lubricant in the casing. -Casing volume for calculations is based on field observation of casing for a 1380 hp Caterpillar G3516B LE engine (b). -Input parameters based on material specifications for AP 101(c) grease. -Assume all emissions from maintenance activity occur in one hour.	Temperature (F) Vapor pressure of material stored (psia) Molecular weight (lb/mole) V <sub>v</sub> Casing volume (ft <sup>3</sup> ) (1 ft * 3 ft) Ideal loss constant (psi-ft <sup>3</sup> lb <sup>-1</sup> mol <sup>-1</sup> R) Number of activities per year (Number of seal changes per year per engine)	104 0.001 500 2.355 10.73 2	Change Loss (lb/activity) Number of Engines	1 0.0001	VOC 0.0001	0.000001	Site-Specific Data
4	(b)(2) Glycol Dehydration	-Calculations based on physical properties of mono ethylene glycol (MEG(d) because of its low molecular weight and high vapor pressure which gives the most conservative estimate. -Typically the glycol solution used in dehydration unit is not entirely replaced but it is conservatively assumed that the glycol solution is drained once per year for vessel maintenance. -Per field experience 4000 gal of glycol solution is used in a large dehydration unit. -Assume all emissions from opening, loading, and clingleage occur in three separate hours.	Temperature (F) Vapor Pressure (psia) Saturation Factor Molecular Weight (lb/mol) Glycol Solution (gal/activity) Temperature (F) Vapor Pressure (psia) Molecular Weight (lb/mol) V <sub>v</sub> Vessel volume (ft <sup>3</sup> ) (5 ft radii * 30 ft height) Ideal loss constant (psi-ft <sup>3</sup> lb <sup>-1</sup> mol <sup>-1</sup> R) Number of activities per year	68 0.001 1 62.07 4000 68 0.001 63.07 2.355 10.73 1	Loading Loss L <sub>t</sub> (lb/(1000 gal)) Loading loss per activity (lb/activity) Number of Delay Units	0 0.0005 0 62.07 4000 68 0.0155 63.07 2.355 10.73 1	VOC 0.00	0.00	Site-Specific Data

EMISSIONS FOR MISCELLANEOUS MSS ACTIVITIES (FINMSS-FUG)

BABGMANN TRUST UNIT B1 AND FRA NZ UNIT A1 May 30 2012 through May 29 2013

TRIBUNTON RESOURCES OIL & GAS COMPANY INC

BRINGING IT IN: RESOURCES USE & GAMES COMBINATIONS

**EMISSIONS FOR MISCELLANEOUS ACTIVITIES (FINMSS-FUG)**  
**BARGMANN TRUSTUNI BLAND FRANZ UNIT A1** May 30 2012 through May 29 2013

14a	(b) (10) Coating (spray)	-If use less than 100 gal/yr coating and less than 50 gal/yr of solvent, activity is De Minimis regardless of the application method. -Assume max VOC content is allowed by 30 TAC 11.5, i.e., 3.5 lb/gal. Emission calculation formula and emission factors are defined in TCEQ Technical Guidance Document for Surface Coating Operations dated April 2001. The calculations do not account for any enclosure or control device.	Maximum hourly coating usage rate (gal/hr-gal) Maximum annual coating usage rate (gal/yr-gal) Number of guns with concurrent coating Max VOC content (lb/gal)	5 99 1 3.5	Maximum Hourly Emissions (lb/hr) Maximum Annual Emissions (T/yr)	17.500 0.173	VOC 0.00	0.00	Site-Specific Data		
14b	(b) (10) Coating (spray)	-If use less than 100 gal/yr coating and less than 50 gal/yr of solvent, activity is De Minimis regardless of the application method. -Emission calculation formula and emission factors are defined in TCEQ Technical Guidance Document for Surface Coating Operations dated April 2001. -It is assumed that 90% of the overspray fails to the ground per TCEQ Memo dated January 10, 1994. -All PM is assumed to be PM and PM10 (i.e., no particle size distribution is applied). The calculations do not account for any enclosure or control device.	Maximum hourly coating usage rate (gal/hr-gal) Maximum annual coating usage rate (gal/yr-gal) Max Density (lb/gal) Percent Overspray for PM (%) Max Solids content (%) Max Solids content (%) Fallout factor content (%)	5 99 23 500.00% 70.00% 70.00% 90.00%	Maximum Hourly Emissions (lb/hr) Maximum Annual Emissions (T/yr)	4.543 0.040	PM10 PM	0.00 0.00	Site-Specific Data		
15	(b) (7) Pigging Activities	-Based on an estimate of 50 scf of gas being degassed per event at 900 psi -Assume all emissions from maintenance activity occur in one hour.	Volume degassed (at pressure) (scf) Pressure at which stream is degassed (psi) Molar Weight (lb/mole) Molar volume conversion (scf/(lb/mole)) Inlet stream VOC content (%) Inlet stream H <sub>2</sub> S content (%) Type of Control Equipment Control Efficiency (%) Events per Hour Events per Year	0 900 28.96 379.4 25.00% 0.02% 0.00% 1 52	Volume degassed (at pressure) (scf) Stream Specific Gravity Stream Density (lb/scf)	0.00 0.752 0.057	VOC H <sub>2</sub> S	0.00 0.00	Site-Specific Data		
16	(b) (9) Condensate Tank Cleaning Activities	-For condensate tanks and storage vessels -Assumed volume drained is equal to 1% of the vessel volume -Assumed drained material is immediately placed in a closed vessel. To be conservative, this time is represented as 15 minutes -Assumes an average daily temperature of 95F, per TCEQ guidance. -Assume all emissions from opening, loading, and evaporation occur in three separate hours.	P <sub>v</sub> vapor pressure of material (psia) Vessel Height (ft) Vessel Diameter (ft) Vessel Volume (ft <sup>3</sup> ) Average Daily Temperature (F) Ideal gas constant (psi-ft <sup>3</sup> /lb-mol-R) MW <sub>v</sub> , vapor molecular weight (lb/lb-mol) Saturation Factor U/wind speed (mph) Surface Area Ap (m <sup>2</sup> ) U-time material sits uncovered (hr) Condensate stream H <sub>2</sub> S content (%) Type of Control Equipment Control Efficiency % (for opening losses only) Events per Hour per tank Events per Year/tank	11.64 25 12 500 72.1 10.73 36 0.60 3.52 1 0.25 0.01% Flare 98.00% 1 1	V <sub>v</sub> , volume of vessel (ft <sup>3</sup> ) Lo, opening loss (lb/activity) Lo, opening loss (lb/activity) Loading loss factor (lb/1000 gal loaded) V <sub>t</sub> , volume of liquid drained Loading loss per activity (due to draining) (lb/activity) Vapor Pressure P <sub>v</sub> (Pa) Evaporation Loss (lb activity)	2897.49 206.05 5.89 210.00 124 8025.50 24.46 231.75	Number of Condensate Tanks 7	VOC H <sub>2</sub> S	4.12 0.0004	0.02 0.00002	Site-Specific Data
17	(b) (9) Non-Condensate Tank Cleaning Activities	-For non-condensate tanks and storage vessels -Assumed volume drained was equal to 1% of the vessel volume -Assumed drained material is immediately placed in a closed vessel. To be conservative, this time is represented as 15 minutes -Assumes an average daily temperature of 95F, per TCEQ guidance. -Assume all emissions from opening, loading, and evaporation occur in three separate hours.	P <sub>v</sub> vapor pressure of material (psia) Vessel Height (ft) Vessel Diameter (ft) Vessel Volume (ft <sup>3</sup> ) Average Daily Temperature (F) Ideal gas constant (psi-ft <sup>3</sup> /lb-mol-R) MW <sub>v</sub> , vapor molecular weight (lb/lb-mol) Saturation Factor U/wind speed (mph) Surface Area Ap (m <sup>2</sup> ) U-time material sits uncovered (hr) Produced Water Stream H <sub>2</sub> S Content (%) Type of Control Equipment Control Efficiency % (for opening losses only) Events per Hour per tank	0.116 25 12 500 72.1 10.73 36 0.60 3.52 1 0.25 0.02% Flare 98.00% 1	V <sub>v</sub> , volume of vessel (ft <sup>3</sup> ) Lo, opening loss (lb/activity) Lo, opening loss (lb/activity) Loading loss factor (lb/1000 gal loaded) V <sub>t</sub> , volume of liquid drained Loading loss per activity (due to draining) (lb/activity) Vapor Pressure P <sub>v</sub> (Pa) Evaporation Loss (lb activity)	2897.49 206.05 5.89 210.00 124 8025.50 24.46 231.75	Number of Non-Condensate Tanks 2	VOC H <sub>2</sub> S	0.04 0.00001	0.00005 0.000001	Site-Specific Data

Note: The emissions from the MSS Activities presented above are determined using equations and applicable default values presented by the TCEQ in 106.359(b), as well as equations from AP-42. Blowdown emissions §106.359(b)(8) are accounted for on a separate page when applicable.

**CALCULATION OF COMPRESSOR ENGINE STARTER VENT POTENTIAL TO EMIT- MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

Description	Facility Identification Number
	COMP-01-SV
Number of Engine Starts per Year	52
Number of Engine Starts per Hour	1
Start Volume per Event, scf	900
Fuel Stream Specific Gravity	0.7548
Fuel Stream Density, lb/scf <sup>a</sup>	0.058
VOC Percentage in Fuel Stream, wt%	25%
Max H <sub>2</sub> S Percentage in Fuel Stream, wt%	0.02%
VOC Hourly Emission Rates (lb/hr): <sup>b</sup>	13.05
VOC Annual Emission Rates (T/yr): <sup>c</sup>	0.34
H <sub>2</sub> S Hourly Emission Rates (lb/hr): <sup>b</sup>	0.01
H <sub>2</sub> S Annual Emission Rates (T/yr): <sup>c</sup>	0.0003

<sup>a</sup> Gas stream density is calculated as follows:

$$(28.96 \text{ lb/mole}) / (379 \text{ scf/mole}) * (0.7548) = 0.058 \text{ lb/scf}$$

<sup>b</sup> Hourly starter vent VOC and H<sub>2</sub>S emissions are calculated based upon a conservative estimate of the portion of each constituent in the volume known to blow down from the engine source. An example calculation for VOC for COMP-01-SV is as follows:

$$\text{VOC lb/hr} = (1 \text{ startup/hr}) * (900 \text{ scf/startup}) * (0.058 \text{ lb/scf}) * (25.00\%) = 13.05 \text{ lb/hr}$$

<sup>c</sup> Annual starter VOC emission rates are calculated as follows:

$$\text{VOC lb/hr} = (52 \text{ startups/yr}) * (900 \text{ scf/startup}) * (0.058 \text{ lb/scf}) * (25.00\%) / (2,000 \text{ lb/T}) = 0.34 \text{ T/yr}$$

**CALCULATION OF COMPRESSOR ENGINE BLOWDOWN POTENTIAL TO EMIT - MSS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

Description	Facility Identification Number COMP-01-BD
Number of Blowdowns per Year	52
Number of Blowdowns per Hour	1
Blowdown Volume per Event, scf	410
Gas Stream Specific Gravity	0.7548
Gas Stream Density, lb/scf <sup>a</sup>	0.058
Max VOC Percentage in Gas Stream, wt%	25%
Max H <sub>2</sub> S Percentage in Gas Stream, wt%	0.02%
VOC Hourly Emission Rates (lb/hr): <sup>b</sup>	5.95
VOC Annual Emission Rates (T/yr): <sup>c</sup>	0.15
H <sub>2</sub> S Hourly Emission Rates (lb/hr): <sup>b</sup>	0.005
H <sub>2</sub> S Annual Emission Rates (T/yr): <sup>c</sup>	0.0001
Controlled VOC Hourly Emission Rates (lb/hr)	0.12
Controlled VOC Annual Emission Rates (T/yr):	0.003
Controlled H <sub>2</sub> S Hourly Emission Rates (lb/hr)	0.0001
Controlled H <sub>2</sub> S Annual Emission Rates (T/yr):	0.000002

<sup>a</sup> Gas stream density is calculated as follows:

$$(28.96 \text{ lb/mole}) / (379 \text{ scf/mole}) * (0.7548) = 0.058 \text{ lb/scf}$$

<sup>b</sup> Hourly controlled blowdown VOC and H<sub>2</sub>S emissions are calculated based upon a conservative estimate of the portion of each constituent in the volume known to blow down from the engine source. An example calculation for VOC for COMP-01-BD is as follows:

$$\text{VOC lb/hr} = (1 \text{ blowdown/hr}) * (410 \text{ scf/blowdown}) * (0.058 \text{ lb/scf}) * (25.00\% \text{ VOC in Stream}) * (100\% - 98\% \text{ controlled at flare}) = 5.95 \text{ lb/hr}$$

<sup>c</sup> Annual controlled blowdown VOC emission rates are calculated as follows:

$$\text{VOC lb/hr} = (52 \text{ blowdowns/yr}) * (410 \text{ scf/blowdown}) * (0.058 \text{ lb/scf}) * (25.00\%) / (2,000 \text{ lb/T}) * (100\% - 98\% \text{ controlled at flare}) = 0.15 \text{ T/yr}$$

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - MSS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	LHV <sup>a</sup> (Btu/srf)	Waste Gas Flow Rate		Emission Factors	Units	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)
				Hourly (MMBtu/hr)	Annual (MMBtu/yr)				
FL-1-MSS	FL-1-MSS	Process Flare Compressor Blowdown Gas to Flare Event	1,235	0.51	26.38	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- e	lb/MMBtu lb/MMBtu --	0.14 0.07 --
						SO <sub>2</sub> H <sub>2</sub> S	-- c -- c	-- --	0.01 0.0001
FL-1-MSS	FL-1-MSS	Process Flare Condensate and Slop Tank Cleaning Activities	1,890	6.98	67.91	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- e	lb/MMBtu lb/MMBtu --	1.92 0.56 --
						SO <sub>2</sub> H <sub>2</sub> S	-- c -- c	-- --	0.0002 0.0001
FL-1-MSS	FL-1-MSS	Process Flare Produced Water Tank Cleaning Activities	1,869	0.08	0.23	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- e	lb/MMBtu lb/MMBtu --	0.02 0.01 --
						SO <sub>2</sub> H <sub>2</sub> S	-- c -- c	-- --	0.0001 0.0000004

<sup>a</sup> Waste gas stream lower heating value was taken from the inlet gas analysis.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1-MSS follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Hourly Waste Gas Flow Rate, MMBtu/hr})^{\ast} (\text{Emission Factor, lb/MMBtu}) \\ &= \frac{(0.51 \text{ MMBtu/hr})(0.2755 \text{ lb/MMBtu})}{0.14 \text{ lb/hr CO}} \end{aligned}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the captured stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= (\text{Source H}_2\text{S Emission Rate, lb/hr})^{\ast} (98\% \text{ captured H}_2\text{S stream})^{\ast} (100\% \text{ conversion to SO}_2 \text{ at combustion})^{\ast} (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S})^{\ast} (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ &= \frac{(0.01 \text{ lb/hr H}_2\text{S from Blowdown Event})^{\ast} (98\%)^{\ast} (100\%)^{\ast} (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2)}{0.01 \text{ lb/hr SO}_2} \end{aligned}$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (Tyr)} &= (\text{Annual Waste Gas Flow Rate, MMBtu/yr})^{\ast} (\text{Emission Factor, lb/MMBtu})^{\ast} (1 \text{ T} / 2,000 \text{ lb}) \\ \text{CO (Tyr)} &= \frac{(26.38 \text{ MMBtu/yr})^{\ast} (0.2755 \text{ lb/MMBtu})^{\ast} (1 \text{ T} / 2,000 \text{ lb})}{0.004 \text{ Tyr CO}} \end{aligned}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM ENGINE BLOWDOWN - MSS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Max Engine BD Volume (Mscf/hr)</b>	0.41
<b>Max Engine BD Volume (Mscf/yr)</b>	21
<b>Gas Density (lb/scf)</b>	0.0580

---

<b>Constituent</b>	<b>Heating Value<sup>a</sup> (Btu/lb)</b>	<b>Inlet Gas Weight (%)</b>	<b>Engine BD Emissions<sup>b</sup></b>		<b>Flare Feed Rate<sup>c</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	55.89%	13.29	0.34	0.31	16.06
Ethane	22,304	17.53%	4.17	0.11	0.09	4.86
Propane	21,646	10.53%	2.50	0.06	0.05	2.57
I-Butane	21,242	2.59%	0.62	0.02	0.01	0.83
N-Butane	21,293	3.98%	0.95	0.02	0.02	0.83
I-Pentane	21,025	1.49%	0.35	0.01	0.01	0.41
N-Pentane	21,072	1.19%	0.28	0.01	0.01	0.41
Cyclopentane	20,350	0.00%	0.00	0.00	0.00	0.00
n-Hexane	20,928	1.70%	0.40	0.01	0.01	0.41
Cyclohexane	20,195	0.00%	0.00	0.00	0.00	0.00
Other Hexanes	20,928	0.00%	0.00	0.00	0.00	0.00
Heptanes	20,825	0.00%	0.00	0.00	0.00	0.00
Octanes	20,747	0.00%	0.00	0.00	0.00	0.00
Nonanes	20,687	0.00%	0.00	0.00	0.00	0.00
Decanes Plus	20,638	0.00%	0.00	0.00	0.00	0.00
Benzene	18,172	0.00%	0.00	0.00	0.00	0.00
Toluene	18,422	0.00%	0.00	0.00	0.00	0.00
Ethylbenzene	18,658	0.00%	0.00	0.00	0.00	0.00
Xylene	18,438	0.00%	0.00	0.00	0.00	0.00
			<b>Totals:</b>	<b>0.51</b>	<b>26.38</b>	

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<sup>a</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>b</sup> Constituent Emission Rates were calculated from the known maximum blowdown volumes and density then proportioned using the Inlet Gas stream constituents weight percents. An example calculation for Methane emissions is as follows:

$$\begin{aligned} \text{Methane (lb/hr)} &= \text{Maximum BD Volume (Mscf/hr)} * \text{Gas Density (lb/scf)} * \text{Inlet Gas Weight \%} * 1000 \\ \text{Methane (lb/hr)} &= (0.41 \text{ Mscf/hr}) * (0.0580 \text{ lb/scf}) * 55.89\% * 1,000 \\ \text{Methane (lb/hr)} &= 13.29 \text{ lb/hr} \end{aligned}$$

<sup>c</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\begin{aligned} \text{MMBtu/hr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/hr Methane} &= (23,861 \text{ Btu/lb}) * (13.29 \text{ lb/hr}) * 99\% / (10^6) \\ \text{MMBtu/hr Methane} &= 0.31 \text{ MMBtu/hr} \end{aligned}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\begin{aligned} \text{MMBtu/yr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/yr Methane} &= (23,861 \text{ Btu/lb}) * (0.34 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6) \\ \text{MMBtu/yr Methane} &= 16.06 \text{ MMBtu/yr} \end{aligned}$$

**CALCULATION OF FLARE FEED RATES FROM CONDENSATE AND SLOP TANK CLEANING ACTIVITIES - MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**MSS Condensate and Slop Tank Clean Out Total Emissions<sup>a</sup>**

VOC Emissions (lb/hr):	206.00
VOC Emissions (TPY):	1.00
Hydrocarbon Emissions (lb/hr):	330.34
Hydrocarbon Emissions (TPY):	1.60

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Condensate Tanks Flash Gas Weight (%)	MSS Condensate and Slop Tank Cleaning Activities Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	13.26%	43.80	0.21	1.03	9.92
Ethane	22,304	22.39%	73.96	0.36	1.63	15.90
Propane	21,646	24.11%	79.64	0.39	1.71	16.72
I-Butane	21,242	7.38%	24.38	0.12	0.51	5.00
N-Butane	21,293	13.05%	43.11	0.21	0.90	8.76
I-Pentane	21,025	5.39%	17.81	0.09	0.37	3.71
N-Pentane	21,072	4.61%	15.23	0.07	0.31	2.89
Cyclopentane	20,350	0.31%	1.02	0.005	0.02	0.20
n-Hexane	20,928	1.51%	4.99	0.02	0.10	0.82
Cyclohexane	20,195	0.34%	1.12	0.01	0.02	0.40
Other Hexanes	20,928	2.78%	9.18	0.04	0.19	1.64
Heptanes	20,825	1.47%	4.86	0.02	0.10	0.82
Octanes	20,747	0.48%	1.59	0.01	0.03	0.41
Nonanes	20,687	0.13%	0.43	0.002	0.01	0.08
Decanes Plus	20,638	0.07%	0.23	0.001	0.005	0.04
Benzene	18,172	0.19%	0.63	0.003	0.01	0.11
Toluene	18,422	0.33%	1.09	0.01	0.02	0.36
Ethylbenzene	18,658	0.03%	0.10	0.0005	0.002	0.02
Xylene	18,438	0.18%	0.59	0.003	0.01	0.11
VOC		62.36%			<b>Total:</b>	<b>6.98</b>
						<b>67.91</b>

<sup>a</sup> Total VOC Emissions were determined by adding the MSS Condensate and Slop Clean Out Stream. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (206.00 \text{ lb/hr}) * (1 / 62.36\%)$$

$$\text{Total HC (lb/hr)} = 330.34 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Condensate Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (43.80 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 1.03 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (0.21 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 9.92 \text{ MMBtu/yr}$$

**CALCULATION OF FLARE FEED RATES FROM PRODUCED WATER TANK CLEANING ACTIVITIES - MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2012 through May 29 2013**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**MSS Produced Water Tank Clean Out Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	2.00
VOC Emissions (TPY):	0.003
Hydrocarbon Emissions (lb/hr):	3.19
Hydrocarbon Emissions (TPY):	0.005

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Produced Water Tanks Flash Gas Weight (%)	MSS Produced Water Tank Cleaning Activities Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	12.96%	0.41	0.001	0.01	0.05
Ethane	22,304	22.15%	0.71	0.001	0.02	0.04
Propane	21,646	24.03%	0.77	0.001	0.02	0.04
I-Butane	21,242	7.46%	0.24	0.0004	0.005	0.02
N-Butane	21,293	13.18%	0.42	0.001	0.01	0.04
I-Pentane	21,025	5.44%	0.17	0.0003	0.004	0.01
N-Pentane	21,072	4.65%	0.15	0.0002	0.003	0.01
Cyclopentane	20,350	0.32%	0.01	0.00002	0.0002	0.001
n-Hexane	20,928	1.52%	0.05	0.0001	0.001	0.004
Cyclohexane	20,195	0.34%	0.01	0.00002	0.0002	0.001
Other Hexanes	20,928	2.81%	0.09	0.0001	0.002	0.004
Heptanes	20,825	1.48%	0.05	0.0001	0.001	0.004
Octanes	20,747	0.48%	0.02	0.00002	0.0004	0.001
Nonanes	20,687	0.13%	0.004	0.00001	0.0001	0.0004
Decanes Plus	20,638	0.08%	0.003	0.000004	0.0001	0.0002
Benzene	18,172	0.19%	0.01	0.00001	0.0002	0.0004
Toluene	18,422	0.33%	0.01	0.00002	0.0002	0.001
Ethylbenzene	18,658	0.03%	0.001	0.000002	0.00002	0.0001
Xylene	18,438	0.18%	0.01	0.00001	0.0002	0.0004
VOC		62.65%				
<b>Total:</b>					<b>0.08</b>	<b>0.23</b>

<sup>a</sup> Total VOC Emissions were determined by adding the MSS Produced Water Clean Out Stream. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (2.00 \text{ lb/hr}) * (1 / 62.65\%)$$

$$\text{Total HC (lb/hr)} = 3.19 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Produced Water Flash Gas stream constituents weight percents, generated by the WinSim

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (0.41 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.01 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (0.0010 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 0.05 \text{ MMBtu/yr}$$

TABLE 3-1  
ACTUAL AIR EMISSION RATES  
BARGMANN TRUST UNIT BI AND FRANZ UNIT AI May 30 2013 through May 08 2014  
BURLINGTON RESOURCES OIL & GAS COMPANY LP

EPN	FIN	Description	Proposed Allowable Hourly and Annual Emission Rates					
			VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	PM <sub>10</sub> /PM <sub>2.5</sub> (T/yr)	SO <sub>2</sub> (lb/hr)	H <sub>2</sub> S (T/yr)
Normal Operations and Alternative Operating Scenarios								
COMP-01		Compressor Engine 1	0.88	3.66	1.76	7.33	3.53	14.70
FUG		Site Fugitives	0.93	3.93	--	--	0.21	0.05
FL-1	TK-01, TK-02	Controlled Condensate Tank Emissions	0.38	1.44	--	--	0.004	0.02
	TK-03, TK-04	Controlled Slop Tank Emissions	0.17	0.09	--	--	--	--
FL-1	TK-07	Controlled PW Tank Emissions	0.03	0.10	--	--	--	--
FL-1	TK-08, TK-09	Antifreeze Liquid Storage	0.50	0.01	--	--	0.00004	0.0002
TK-AF	TK-LO	Lube Oil/Liquid Storage	0.0002	0.000002	--	--	--	--
	TK-SCAV	H <sub>2</sub> S Scavenger Liquid Storage	<0.01	<0.01	--	--	--	--
FL-1	TRUCK1	Controlled Condensate and Slop Truck Loading	0.90	0.27	--	--	--	--
FL-1	TRUCK2	Controlled Produced Water Truck Loading	0.01	0.004	--	--	--	--
TRUCK1	TRUCK1	Uncaptured Condensate and Slop Truck Loading	0.60	0.18	--	--	--	--
TRUCK2	TRUCK2	Uncaptured Produced Water Truck Loading	0.01	0.002	--	--	--	--
FL-1	FL-1	Flare Combustion - Normal Operations (pilot, assist, and waste gas)	0.01	0.04	0.57	1.37	1.15	2.76
FL-1	SEP-GAS	Low Pressure Separator Gas to Flare - AOS	0.00	0.00	--	--	--	--
FL-1	FL-1	Flare Combustion - AOS (pilot, assist, and waste gas)	--	--	0.00	0.00	0.00	--
TK-01, TK-02	TK-01, TK-02	Uncontrolled Condensate Tank Standing Loss	4.91	0.41	--	--	--	--
TK-03, TK-04	TK-03, TK-04	Emissions- AOS			--	--	--	--
TK-05, TK-06	TK-05, TK-06	Uncontrolled Slop Tank Standing Loss Emissions-			--	--	--	--
TK-07	TK-07	AOS	0.82	0.07	--	--	--	--
TK-08, TK-09	TK-08, TK-09	Uncontrolled PW Tank Standing Loss Emissions- AOS	0.002	0.0001	--	--	--	--
Scheduled Maintenance, Startup and Shutdown Events								
COMP-01-SV	COMP-01-SV	Compressor Engine Starter Vent	13.05	0.34	--	--	--	0.01
FL-1-MSS	COMP-01-BD	Compressor Engine Blowdown	0.12	0.003	--	--	--	0.0003
FL-1-MSS	FL-1-MSS	Flare Combustion (waste gas)	--	--	0.07	0.002	0.14	0.00002
MSS-FUG	MSS-FUG	Miscellaneous MSS Activities	5.72	0.16	--	--	2.74	1.46
Site-Wide Emissions:			10.71	--	8.70	--	17.46	--
							0.12	--
							0.002	--
							0.25	--

Note: Aggregated HAP emissions at the Site will be below 10 tpy.

## CALCULATION OF COMPRESSOR ENGINE POTENTIAL TO EMIT

BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014

## BURLINGTON RESOURCES OIL &amp; GAS COMPANY LP

EPN	FIN	Description	Type	Engine Ratings		Fuel Consumption (Btu/hp-hr)	Operating Hours (hr/yr)	Pollutant	Emission Factors <sup>a</sup>	Units	Annual	
				Rated Horsepower (hp)	Hours (hr/yr)						Hourly <sup>a</sup>	Annual <sup>b</sup>
COMP-01	COMP-01	Compressor Engine 1	Caterpillar G3408TA Rich Burn NSCR Catalyst AFR Controller	400	7,008	8,328	CO PM/PM <sub>10</sub> /PM <sub>2.5</sub> NO <sub>x</sub> SO <sub>2</sub> VOC CH <sub>2</sub> O	4.00 2.00 0.01941 10 1.00 0.0205	g/hp-hr g/hp-hr lb/MMBu ppm S g/hp-hr lb/MMBu	3.53 1.76 0.05 0.004 0.88 0.06	14.70 7.33 0.21 0.02 3.66 0.25	

<sup>a</sup> The Emission Factors for engine COMP-01 for CO, NO<sub>x</sub> and VOC are based on vendor data and information. The VOC emission factor includes the CH<sub>2</sub>O emission factor from AP-42 because the vendor provided information does not include formaldehyde. An example calculation for hourly CO emissions for EPN COMP-01 follows:

$$CO \text{ (lb/hr)} = (\text{Rated Horsepower, hp})^*(\text{Emission Factor, g/hp-hr})*(1 \text{ lb}/453.59 \text{ g})$$

$$\begin{aligned} CO \text{ (lb/hr)} &= (400 \text{ hp})^*(4,000 \text{ g/hp-hr})*(1 \text{ lb}/453.59 \text{ g}) \\ &= \boxed{3.53} \text{ lb/hr CO} \end{aligned}$$

The PM/PM<sub>10</sub> and CH<sub>2</sub>O Emission Factors for EPN COMP-01 are from AP-42 Chapter 3. An example calculation for hourly PM emissions for EPN COMP-01 follows:

$$PM \text{ (lb/hr)} = (\text{Fuel Consumption, Btu}/\text{hp-hr})^*(\text{Rated Horsepower, hp})^*(1 \text{ MMBtu}/10^6 \text{ Btu})^*(\text{Emission Factor, lb/MMBu})$$

$$\begin{aligned} PM \text{ (lb/hr)} &= (7,008 \text{ Btu}/\text{hp-hr})^*(400 \text{ hp})^*(1 \text{ MMBtu}/10^6 \text{ Btu})^*(0.01941 \text{ lb/MMBu}) \\ &= \boxed{0.05} \text{ lb/hr PM} \end{aligned}$$

A material balance approach was used to estimate the SO<sub>2</sub> emission rates using the maximum sulfur concentration in the natural gas. H<sub>2</sub>S Scavenger liquids are used to bring the fuel gas H<sub>2</sub>S concentration below 10 ppm S. An example calculation for hourly SO<sub>2</sub> emissions for EPN COMP-01 follows:

$$\begin{aligned} SO_2 \text{ (lb/hr)} &= (\text{Fuel Consumption, Btu}/\text{hp-hr})^*(\text{Rated Horsepower, hp})/(\text{Lower Fuel Heating Value, Btu/scf})^*(\text{Sulfur Content, ppmv})*(\text{1 lb-mol}/379 \text{ scf})*(\text{32.06 lb S/lb-mol})*(\text{64.06 lb SO}_2/32.06 \text{ lb S}) \\ SO_2 \text{ (lb/hr)} &= (7,008 \text{ Btu}/\text{hp-hr})^*(276 \text{ hp})/(1,235 \text{ Btu/scf})^*(10 \text{ scf}/10^6 \text{ scf/gas})*(\text{1 lb-mol}/379 \text{ scf})*(\text{32.06 lb S/lb-mol})*(\text{64.06 lb SO}_2/32.06 \text{ lb S}) \\ &= \boxed{0.004} \text{ lb/hr SO}_2 \end{aligned}$$

<sup>b</sup> An example calculation for annual CO emissions for EPN COMP-01 follows:

$$\begin{aligned} CO \text{ (T/yr)} &= (\text{Hourly PTE, lb/hr})^*(\text{Annual Operating Hours, hr/yr})*(1 \text{ T}/2,000 \text{ lb}) \\ CO \text{ (T/yr)} &= (3.53 \text{ lb/hr})^*(8,328 \text{ hr/yr})*(1 \text{ T}/2,000 \text{ lb}) \\ &= \boxed{14.70} \text{ T/yr CO} \end{aligned}$$

**CALCULATION OF SITE FUGITIVES (PIN FUG) POTENTIAL TO EMIT**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

Component	Number of Components	Emission Factors <sup>a</sup> (lb/hr-component)	Annual Operating Hours (hr/yr)	Maximum VOC <sup>a</sup> (wt%)	Maximum H <sub>2</sub> S (wt%)	Reduction Credit <sup>a</sup> (%)	PTE VOC		PTE H <sub>2</sub> S	
							Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)
<b>Valves</b>										
Gas Streams	94	0.00992	8,328	25%	0.02%	0%	0.23	0.97	0.0002	0.001
Light Oil	86	0.0055	8,328	100%	--	0%	0.47	1.97	--	--
Water/Light Oil	99	0.000216	8,328	--	--	0%	0.02	0.09	--	--
<b>Pumps</b>										
Water/Light Oil	2	0.000052	8,328	--	--	0%	0.0001	0.0004	--	--
<b>Compressors</b>										
Gas	1	0.009920	8,328	25%	0.02%	0%	0.01	0.04	0.000002	0.00001
<b>Flanges</b>										
Gas Streams	156	0.00086	8,328	25%	0.02%	0%	0.03	0.14	0.00003	0.0001
Light Oil	77	0.000243	8,328	100%	--	0%	0.02	0.08	--	--
Water/Light Oil	20	0.000006	8,328	--	--	0%	0.0001	0.0000	--	--
<b>Connectors</b>										
Gas Streams	180	0.00044	8,328	25%	0.02%	0%	0.02	0.08	0.00002	0.0001
Light Oil	179	0.000463	8,328	100%	--	0%	0.08	0.35	--	--
Water/Light Oil	206	0.000243	8,328	--	--	0%	0.05	0.21	--	--
<b>TOTAL:</b>							<b>0.93</b>	<b>3.93</b>	<b>0.0003</b>	<b>0.001</b>

<sup>a</sup> Fugitive Emission Factors and Reduction Credits are per TCEQ Technical Guidance Document for Equipment Leak Fugitives, dated October 2000. The emission factors are for total hydrocarbon, except for the emission factors associated with Water/Light Oil. As indicated on page 6 of 55 in the mentioned Guidance document, these factors are based off of a known stream constituency of 50%-99% water, and remainder VOC. Therefore, applying a VOC wt % would be double counting for the reduction due to water.

<sup>b</sup> Hourly VOC emission rates are calculated as follows:  
 $(94 \text{ components}) * (0.00992 \text{ lb/hr-component}) * (25\% \text{ VOC}) * (100\% - 0\% \text{ reduction credit}) = 0.23 \text{ lb/hr}$

<sup>c</sup> Annual VOC emission rates are calculated as follows:  
 $(94 \text{ components}) * (0.00992 \text{ lb/hr-component}) * (8,328 \text{ hr/yr}) * (25\% \text{ VOC}) * (100\% - 0\% \text{ reduction credit}) / (2,000 \text{ lb/T}) = 0.97 \text{ T/yr}$

**SUMMARY OF TANKS SENT TO FLARE POTENTIAL TO EMIT**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	VOC Emissions						H <sub>2</sub> S Emissions <sup>c</sup>					
			Flash Emissions <sup>a</sup>		Working Breathing Emissions <sup>b</sup>		Uncontrolled Total		Controlled Total <sup>d</sup>		Uncontrolled Total		Controlled Total <sup>d</sup>	
			Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual
FL-1	TK-01, TK-02	500 bbl Condensate Storage Tanks	10.82	45.05	8.38	26.99	19.20	72.04	0.38	1.44	0.002	0.01	0.00004	0.0002
FL-1	TK-03, TK-04	500 bbl Produced Water Storage Tank	--	--	8.38	4.59	8.38	4.59	0.17	0.99	--	--	--	--
FL-1	TK-08, TK-09	500 bbl Produced Water Storage Tanks	1.21	5.04	0.08	0.03	1.29	5.07	0.03	0.10	0.0002	0.001	0.00004	0.00002
TK-AF <sup>e</sup>	TK-AF <sup>f</sup>	Antifreeze Liquid Storage	--	--	0.50	0.01	0.50	0.01	--	--	--	--	--	--
TK-LO <sup>e</sup>	TK-LO <sup>f</sup>	Lube Oil Liquid Storage	--	--	0.0002	0.000002	0.0002	0.000002	--	--	--	--	--	--
TK-SCAV <sup>f</sup>	TK-SCAV <sup>f</sup>	H <sub>2</sub> S Scavenger Liquid Storage	--	--	--	<0.01	<0.01	<0.01	--	--	--	--	--	--

Notes:  
<sup>a</sup> VOC Flash Emissions are calculated using the WinSim stream simulation program. Data inputs included the pressurized stream data and throughputs represented in this submittal. See the pages at the end of this attachment for a printout of the data inputs and emissions reports.

<sup>b</sup> The Working/Breathing emissions are calculated using AP 4.2 Chapter 7 calculations with data inputs from the stream data and throughputs. See the following pages for the represented calculations.

<sup>c</sup> The Ideal Gas Law was used to estimate the H<sub>2</sub>S emission rates using the maximum sulfur concentration in the gas coming off the tanks (99 ppm). An example calculation for hourly H<sub>2</sub>S emissions from FIN TK-08 and TK-09 follows:

$$\text{H}_2\text{S (lb/hr)} = (\% \text{ Vol H}_2\text{S in stream}) * (\text{Total Volumetric Flow of Gas, scf/hr}) * (1 \text{ atm STP}) * (34.0798 \text{ lb/lb-mol H}_2\text{S}) / (1.314, atm-scf/lb-mol-K) / (298 K)$$

$$\text{H}_2\text{S (lb/hr)} = (99 \text{ ppm} / 10^6) * (20.84 \text{ scf/hr}) * (1 \text{ atm}) * (34.0798 \text{ lb/lbmol H}_2\text{S}) / (1.314, atm-scf/lb-mol-K) / (298 K)$$

$$\text{H}_2\text{S (lb/hr)} = 0.0002 \text{ lb/hr}$$

<sup>d</sup> All VOC tank emissions are routed to the flare control device with a destruction efficiency of 98%. H<sub>2</sub>S emissions are conservatively represented to be captured at 98% and then 98% converted to SO<sub>2</sub> during combustion, while SO<sub>2</sub> emissions are represented at 100% H<sub>2</sub>S conversion to SO<sub>2</sub>.

<sup>e</sup> Working and breathing emissions for the Antifreeze and Lube Oil tanks were determined using Tanks 4.0D simulation software. The size and number of TK-AF and TK-LO tanks may vary, but the total throughput of the liquid and the associated VOC emissions will not exceed the proposed emission rate. Printouts from the software can be found on the following pages. An example calculation of the hourly emissions for FIN TK-AF follows:

$$\text{VOC(lb/hr)} = [(\text{Breathing Loss, lb/yr}) / (8,760 \text{ hr/yr}) + ((\text{Working Loss, lb/yr}) / (\text{Number of turnovers/yr}) / (\text{Turnovers per hour})) * \text{No. of tanks}]$$

$$\text{VOC(lb/hr)} = ((8,909 \text{ lb/yr}) / (8,760 \text{ hr/yr}) + ((5,9832 \text{ lb/yr}) / (12 \text{ turnovers/yr}) / (1 turnover per hour))) * (1 \text{ Tank})$$

An example calculation of the annual emissions for FIN TK-AF follows:

$$\text{VOC(T/yr)} = ((\text{Working Loss, lb/yr}) + (\text{Breathing Loss, lb/yr}) / (2,000 \text{ ton/yr})) * \text{No. of Tanks}$$

$$\text{VOC(T/yr)} = ((5,9832 \text{ lb/yr} + 8,909 \text{ lb/yr}) / (2,000 \text{ ton/yr})) * 1 \text{ Tank}$$

$$\text{VOC(T/yr)} = 0.011 \text{ lb/hr}$$

<sup>f</sup> The size and number of the H<sub>2</sub>S Scavenger Liquid Storage Tanks may vary, but the total throughput of the liquid and the associated VOC emissions will not exceed the proposed negligible emission rate.

CALCULATION OF STORAGE TANK WORKING AND BREATHING POTENTIAL TO EMIT  
 BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 May 30 2013 through May 08 2014  
 BURLINGTON RESOURCES OIL & GAS COMPANY LP

Variable	Description	Units	Value
$L_T$	Total loss = $L_S + L_W$	Tonyr	See Table
$L_S$	standing loss = 65 Vw Kw Ks	Ib/yr	See Table
$L_W$	working loss = 0.0011 Nv Pv Q Ki Kp	Ib/yr	See Table
$L_H$	working loss = 0.0011 Nv Pv Qs Qh	Ib/hr	See Table
Root Construction		Cone	
Rv/P	Condensate Reid Vapor Pressure	psia	11.64
$\Delta P_b$	Breather vent pressure range	psi	0.06
$\Delta P_b$	Solar insulation factor	Btu/(2-day)	1521
$P_a$	Atmospheric Pressure	psia	14.7
$M_v$	Vapor Molecular Weight	lb/mol	36
T	Average Temperature	°F	72.1
$T_{ax}$	Daily Maximum Ambient Temperature	°R	541.6
$T_{aw}$	Daily Minimum Ambient Temperature	°R	522.5
$\Delta T_A$	Daily average ambient temperature range	°R	19.1
Kp	Product factor		1

Tank Specifications										Material Specifications										VOC					
	VH	D	Ht	Capacity	Color	a	Mv	B <sub>Max</sub>	Q <sup>2</sup>	ΔV <sub>v</sub>	H <sub>vo</sub>	W <sub>v</sub>	R <sub>a</sub>	T <sub>la</sub>	W <sub>v</sub>	ΔP <sub>v</sub>	K <sub>e</sub>	K <sub>n</sub>	K <sub>s</sub>	K <sub>w</sub>	L <sub>T</sub>	L <sub>H</sub>			
Material	No. of Tanks	Tank Type	Tank Diameter (ft)	Tank Capacity (bbl)	Paint Color Conditions	Paint Solar Absorbance Factor	Reid Vapor Pressure (psia)	Max. Hourly Throughput (bblhr)	Annual throughput (bblhr)	Daily Vapor Temp. Range °F	Vapor Space Volume (ft <sup>3</sup> )	Average Vapor Density (lb/ft <sup>3</sup> )	Liquid Surface Temp. °R	Vapor Pressure Range (psia)	Vapor Space Expansion Factor	Vapor Sat. Factor	Turnover Factor	Standing Loss (bblhr)	Working Loss (bblhr)	Total Loss (bblhr)	Total Loss (Troy)				
Condensate	6	V	12	25	500	Gray Good	0.54	36	112.081	36.75	12.63	1428.4	539.8	12.454	0.07740	3.35852	1.5367	0.11	0.30	38,309.82	15,075.25	8.38	26.99		
Slip	1	V	12	25	500	Gray Good	0.54	36	11.64	20	6,000	36.75	12.63	1428.4	539.8	12.454	0.07740	3.35852	1.5367	0.11	1.00	6,484.97	2,680.06	8.38	4.59
PV	2	V	12	25	500	Gray Good	0.54	36	0.116	20	138,000	36.75	12.63	1428.4	539.8	0.032	0.00021	0.00656	0.098	0.27	13.51	44.52	0.98	0.93	

NOTE: Tank working and breathing emissions are based on the equations found in EPA AP 42 Chapter 7. All factors used are represented in the table on this page. The Condensate Reid Vapor Pressure and Vapor Molecular Weight are determined based on the WinSim condensate stream and Off Gas stream. All other variables are found in AP 42 Chapter 7 or are default unit values.

## CALCULATION OF TRUCK LOADING POTENTIAL TO EMIT

BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014

## BURLINGTON RESOURCES OIL & GAS COMPANY LP

Sample Calculations for condensate:

$$\text{Loading Loss (lb/Mgal)} = 12.46 * S * P * M / T (\text{AP-42 Section 5.2})$$

$$\text{Maximum Loading Loss} = 12.46 * 0.60 * 11.640 * 36 / 560 = 5.594 \text{ lb/Mgal}$$

$$\text{Hourly Uncollected Emissions PTE} = (\text{Hourly Throughput, Mgal/hr}) * (\text{Maximum Loading Loss, lb/Mgal}) * (1 - \text{Capture Efficiency})$$

$$\text{Hourly Uncollected Emissions PTE} = (8.19 \text{ Mgal/yr}) * (5.594 \text{ lb/Mgal}) * (1 - 0.987) = 0.60 \text{ lb/hr}$$

$$\text{Hourly PTE} = ((\text{Hourly Throughput, Mgal/hr}) * (\text{Maximum Loading Loss, lb/Mgal}) * (\text{Capture Efficiency}) * (1 - \text{Destruction Efficiency}))$$

$$\text{Hourly PTE} = (8.19 \text{ Mgal/hr}) * (5.594 \text{ lb/Mgal}) * (0.987) * (1 - 0.98) = 0.90 \text{ lb/hr}$$

$$\text{Annual Emissions} = ((\text{Annual Throughput, Mgal/yr}) * (\text{Average Loading Loss, lb/Mgal}) * (\text{Capture Efficiency}) * (1 - \text{Destruction Efficiency})) / (2000 \text{ lb/T})$$

$$\text{Annual Emissions} = (4959.40 \text{ Mgal/yr}) * (5.587 \text{ lb/Mgal}) * (0.987) * (1 - 0.98) / (2000 \text{ lb/T}) = 0.27 \text{ T/yr}$$

FIN	EPN	Facility Name	S	P @ 560 R (psia)	P @ 531.7 R (psia)	M	Maximum Loading Loss (lb/Mgal)	Average Loading Loss (lb/Mgal)	Hourly Throughput (Mgals/hr)	Annual Throughput (Mgals/yr)	Capture Efficiency	Hourly Uncollected Loading Emissions (lb/hr)	Annual Uncollected Loading Emissions (T/yr)	Captured and Controlled Total VOC	
														Uncaptured Total VOC	Captured and Controlled Total VOC
TRUCK1	FL-1/ TRUCK1	Condensate and Slop Truck Loading	0.60	11.64	11.038	36	5.594	5.587	8.19	4,959.40	0.987	0.60	0.18	0.98	0.90
TRUCK2	FL-1/ TRUCK2	Produced Water Truck Loading	0.60	0.12	0.026	36	0.058	0.061	8.19	5,829.60	0.987	0.01	0.002	0.98	0.01

Daily maximum and daily minimum ambient temperature from Tanks 4.09d (for this area's annual averages (81.6 and 62.5, for average of 72.1).

Annual Average Condensate and Slop Vapor Pressure at  $T_{LA}$ :

$$P = \exp \{ [ (2799 / (T-459.6) - 2.227 / \log(10(RVP)) - 726) / (T-459.6) + 12.82 ] \\ \exp \{ [ (2799 / (72.1-459.6) - 2.227 / \log(10(11.64)) - 726) / (72.1-459.6) + 12.82 ] \\ 11.038 \text{ psia} \}$$

Annual Average Produced Water Vapor Pressure at  $T_{LA}$ :

$$P = \exp \{ [ (2799 / (T-459.6) - 2.227 / \log(10(RVP)) - 726) / (T-459.6) + 12.82 ] \\ \exp \{ [ (2799 / (72.1-459.6) - 2.227 / \log(10(11.64*0.01)) - 726) / (72.1-459.6) + 12.82 ] \\ 0.026 \text{ psia} \}$$

NOTE: Capture Efficiency of 98.7% represented based upon TCEQ Guidance regarding trucks that are utilizing NSPS XX Testing.

**SUMMARY OF PROCESS FLARE FUEL GAS COMBUSTION AND  
WASTE GAS COMBUSTION POTENTIAL TO EMIT. NORMAL OPERATIONS AND ALTERNATIVE OPERATING SCENARIOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	VOC		NO <sub>x</sub>		CO		SO <sub>2</sub>		H <sub>2</sub> S	
			(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
FL-1	FL-1	Pilot Gas Combustion	0.0001	0.0004	0.003	0.01	0.01	0.04	0.0003	0.001	0.000001	0.000004
FL-1	FL-1	Flare Assist Gas Combustion	0.01	0.04	0.22	0.92	0.44	1.83	0.02	0.08	0.00001	0.00004
FL-1	FL-1	Waste Gas Combustion- Normal Operations	--	--	0.35	0.44	0.70	0.89	0.004	0.02	0.00004	0.0002
		<b>Normal Operations Total:</b>	<b>0.01</b>	<b>0.04</b>	<b>0.57</b>	<b>1.37</b>	<b>1.15</b>	<b>2.76</b>	<b>0.02</b>	<b>0.10</b>	<b>0.0001</b>	<b>0.0002</b>
FL-1	FL-1	Waste Gas Combustion - ACS	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
		<b>Alternative Operating Scenarios Total:</b>	<b>--</b>	<b>--</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.0000</b>	<b>0.0000</b>

CALCULATION OF FLARE PILOT GAS and FLARE ASSIST GAS POTENTIAL TO EMIT - NORMAL AND AOS  
 BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014  
 BURLINGTON RESOURCES OIL & GAS COMPANY LP

EPN	FIN	Description	LHV (Btu/scf)	Heat Release scf/hr	Operating Hours (hr/yr)	Pollutant	Emission Factors	Units	Emission Rates	
									Hourly <sup>a</sup> (lb/hr)	Annual <sup>b</sup> (T/yr)
FL-1	FL-1	Flare 1- Process Pilot Combustion	1,292	15	8,328	CO NO <sub>x</sub>	0.2755 0.138	lb/MMBtu lb/MMBtu	0.01 0.003	0.04 0.01
						PM/PM <sub>10</sub> /PM <sub>2.5</sub>	-- <sup>c</sup>	--	--	--
						SO <sub>2</sub>	99	ppm H <sub>2</sub> S	0.0003	0.001
						H <sub>2</sub> S	99	ppm H <sub>2</sub> S	0.000001	0.000004
						VOC	5.5	lb/MMscf	0.0001	0.0004
FL-1	FL-1	Flare 1- Process Flare Assist Gas Combustion	1,292	1,250	8,328	CO NO <sub>x</sub>	0.2755 0.138	lb/MMBtu lb/MMBtu	0.44 0.22	1.83 0.92
						PM/PM <sub>10</sub> /PM <sub>2.5</sub>	-- <sup>c</sup>	--	--	--
						SO <sub>2</sub>	99	ppm H <sub>2</sub> S	0.02	0.08
						H <sub>2</sub> S	99	ppm H <sub>2</sub> S	0.0001	0.00004
						VOC	5.5	lb/MMscf	0.01	0.04

<sup>a</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Heat Release, scf/hr}) * (\text{Lower Heating Value, Btu/scf}) * (\text{MM}/10^6)^*(\text{Emission Factor, lb/MMBtu}) \\ \text{CO (lb/hr)} &= (15 \text{ scf/hr}) * (1,292 \text{ Btu/scf}) * (\text{MM}/10^6)^*(0.2755 \text{ lb/MMBtu}) \\ &= \boxed{0.01 \text{ lb/hr CO}} \end{aligned}$$

The Emission Factors for SO<sub>2</sub> and VOC were based upon AP-42 Table 1.4-2 (dated 7/98). An example calculation for hourly VOC emissions for EPN FL-1 follows:

$$\begin{aligned} \text{VOC (lb/hr)} &= (\text{Heat Release, scf/hr}) * (\text{MM}/10^6)^*(\text{Emission Factor, lb/MMscf}) \\ \text{VOC (lb/hr)} &= (15 \text{ scf/hr}) * (\text{MM}/10^6)^*(5.5 \text{ lb/MMscf}) \\ &= \boxed{0.0001 \text{ lb/hr VOC}} \end{aligned}$$

A material balance approach was used to estimate the SO<sub>2</sub> and H<sub>2</sub>S emission rates using the max sulfur concentration in the natural gas. As shown in Figure 6-1, H<sub>2</sub>S concentration at the site is conservatively represented at 099 ppm. To be conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for the pilot gas of EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= \text{Heat Release (scf/hr)} * (\text{Sulfur Content, ppmv})^*(100\% \text{ conversion to SO}_2)^*(1 \text{ lb-mol}/379 \text{ scf})^*(34.065 \text{ lb H}_2\text{S}/\text{lb-mol})^*(64.06 \text{ lb SO}_2/34.065 \text{ lb H}_2\text{S}) \\ \text{SO}_2 \text{ (lb/hr)} &= (15 \text{ scf/hr}) * (99 \text{ ppm H}_2\text{S})/10^6 \text{ scf gas})^*(1 \text{ lb-mol}/379 \text{ scf})^*(100\% \text{ converted to SO}_2)^*(34.065 \text{ lb H}_2\text{S}/\text{lb-mol})^*(64.06 \text{ lb SO}_2/34.065 \text{ lb H}_2\text{S}) \\ &= \boxed{0.0003 \text{ lb/hr SO}_2} \end{aligned}$$

<sup>b</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (T/yr)} &= (\text{Hourly Emissions, lb/hr})^*(\text{Annual Operating Hours, hr/yr})^*(1 \text{ T}/2,000 \text{ lb}) \\ \text{CO (T/yr)} &= (0.01 \text{ lb/hr})^*(3,328 \text{ hr/yr})^*(1 \text{ T}/2,000 \text{ lb}) \\ \text{CO (T/yr)} &= \boxed{0.04 \text{ T/yr CO}} \end{aligned}$$

<sup>c</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - NORMAL OPERATIONS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	LHV <sup>a</sup> (Btu/scf)	Waste Gas Flow Rate		Emission Factors	Units	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)
				Hourly (MMBw/hr)	Annual (MMBtu/yr)				
FL-1	FL-1	Process Flare Condensate and Slop Tanks and Loading	1,890	2.47	6,111.19	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.68 0.34 --
FL-1	FL-1	Process Flare Produced Water Tank and Loading	1,869	0.06	355.37	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.05 0.02 --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	-- --	0.004 0.0004
						H <sub>2</sub> S	-- <sup>c</sup>	--	0.00004

<sup>a</sup> Waste gas stream lower heating value was taken from WinSim calculated stream value.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Hourly Waste Gas Flow Rate, MMBtu/hr}) * (\text{Emission Factor, lb/MMBtu}) \\ \text{CO (lb/hr)} &= (2.47 \text{ MMBtu/hr}) * (0.2755 \text{ lb/MMBtu}) \\ &= \boxed{0.68} \text{ lb/hr CO} \end{aligned}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the tanks to the flare and from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= (\text{Source H}_2\text{S Emission Rate, lb/hr}) * (98\% \text{ captured H}_2\text{S stream}) * (100\% \text{ conversion to SO}_2 \text{ at combustion}) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ \text{SO}_2 \text{ (lb/hr)} &= (0.002 \text{ lb/hr H}_2\text{S} \text{ at Condensate Tanks}) * (98\%) * (100\%) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ &= \boxed{0.004} \text{ lb/hr SO}_2 \end{aligned}$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (T/yr)} &= (\text{Annual Waste Gas Flow Rate, MMBtu/yr}) * (\text{Emission Factor, lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb}) \\ \text{CO (T/yr)} &= (6,111.19 \text{ MMBtu/yr}) * (0.2755 \text{ lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb}) \\ &= \boxed{0.84} \text{ T/yr CO} \end{aligned}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM FINs TK-01 THROUGH TK-03, TK-05, and TRUCK1**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**TK-01 through TK-03, TK-05, and TRUCK1 Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	72.58
VOC Emissions (TPY):	90.13
Hydrocarbon Emissions (lb/hr):	116.39
Hydrocarbon Emissions (TPY):	144.53

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Condensate Tanks Flash Gas Weight (%)	TK-01 through TK-03, TK-05 and TRUCK1 Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	13.26%	15.43	19.16	0.36	905.21
Ethane	22,304	22.39%	26.06	32.36	0.58	1,429.08
Propane	21,646	24.11%	28.06	34.85	0.60	1,493.64
I-Butane	21,242	7.38%	8.59	10.67	0.18	444.24
N-Butane	21,293	13.05%	15.19	18.86	0.32	787.11
I-Pentane	21,025	5.39%	6.27	7.79	0.13	321.02
N-Pentane	21,072	4.61%	5.37	6.66	0.11	275.07
Cyclopentane	20,350	0.31%	0.36	0.45	0.01	17.95
n-Hexane	20,928	1.51%	1.76	2.18	0.04	89.42
Cyclohexane	20,195	0.34%	0.40	0.49	0.01	19.40
Other Hexanes	20,928	2.78%	3.24	4.02	0.07	164.90
Heptanes	20,825	1.47%	1.71	2.12	0.03	86.53
Octanes	20,747	0.48%	0.56	0.69	0.01	28.06
Nonanes	20,687	0.13%	0.15	0.19	0.003	7.70
Decanes Plus	20,638	0.07%	0.08	0.10	0.002	4.05
Benzene	18,172	0.19%	0.22	0.27	0.004	9.62
Toluene	18,422	0.33%	0.38	0.48	0.01	17.33
Ethylbenzene	18,658	0.03%	0.03	0.04	0.001	1.46
Xylene	18,438	0.18%	0.21	0.26	0.004	9.40
VOC		62.36%				
				<b>Total:</b>	<b>2.47</b>	<b>6,111.19</b>

<sup>a</sup> Total VOC Emissions were determined by adding the Uncontrolled Streams for FIN TK-01 through TK-03 and TK-05 on the Tank Summary table with the uncontrolled emissions from the Condensate Truck Loading. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (72.58 \text{ lb/hr}) * (1 / 62.36\%)$$

$$\text{Total HC (lb/hr)} = 116.39 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Condensate Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (15.43 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.36 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (19.16 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 905.21 \text{ MMBtu/yr}$$

**CALCULATION OF FLARE FEED RATES FROM FIN TK-04 and TRUCK2**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**TK-04 and TRUCK2 Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	1.79
VOC Emissions (TPY):	5.27
Hydrocarbon Emissions (lb/hr):	2.86
Hydrocarbon Emissions (TPY):	8.41

<b>Constituent</b>	<b>Heating Value<sup>b</sup> (Btu/lb)</b>	<b>Produced Water Tanks Flash Gas Weight (%)</b>	<b>TK-04 and TRUCK2 Emissions<sup>c</sup></b>		<b>Flare Feed Rate<sup>d</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	12.96%	0.37	1.09	0.01	51.50
Ethane	22,304	22.15%	0.63	1.86	0.01	82.14
Propane	21,646	24.03%	0.69	2.02	0.01	86.58
I-Butane	21,242	7.46%	0.21	0.63	0.004	26.23
N-Butane	21,293	13.18%	0.38	1.11	0.01	46.33
I-Pentane	21,025	5.44%	0.16	0.46	0.003	18.96
N-Pentane	21,072	4.65%	0.13	0.39	0.003	16.11
Cyclopentane	20,350	0.32%	0.01	0.03	0.0002	1.20
n-Hexane	20,928	1.52%	0.04	0.13	0.001	5.33
Cyclohexane	20,195	0.34%	0.01	0.03	0.0002	1.19
Other Hexanes	20,928	2.81%	0.08	0.24	0.002	9.84
Heptanes	20,825	1.48%	0.04	0.12	0.001	4.90
Octanes	20,747	0.48%	0.01	0.04	0.0002	1.63
Nonanes	20,687	0.13%	0.004	0.01	0.0001	0.41
Decanes Plus	20,638	0.08%	0.002	0.01	0.00004	0.40
Benzene	18,172	0.19%	0.01	0.02	0.0002	0.71
Toluene	18,422	0.33%	0.01	0.03	0.0002	1.08
Ethylbenzene	18,658	0.03%	0.001	0.003	0.00002	0.11
Xylene	18,438	0.18%	0.01	0.02	0.0002	0.72
<b>VOC</b>		<b>62.65%</b>				
					<b>Total: 0.06</b>	<b>355.37</b>

<sup>a</sup> Total VOC Emissions were determined by adding the Uncontrolled Streams for FIN TK-04 on the Tank Summary table and the uncontrolled emissions associated with the produced water loading, FIN TRUCK2. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1/\text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (1.79 \text{ lb/hr}) * (1/ 62.65\%)$$

$$\text{Total HC (lb/hr)} = 2.86 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Produced Water Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (0.37 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.01 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (1.09 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 51.50 \text{ MMBtu/yr}$$

CALCULATION OF SEPARATOR GAS ROUTED TO FLARE POTENTIAL TO EMIT - AOS  
 BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014

BURLINGTON RESOURCES OIL & GAS COMPANY LP

Facility Identification Number (FIN)	Gas Throughput (MSCF/hr)	Gas Volume Sent to Flare (MSCF/yr)	Gas Stream Molecular Weight (lb/lb-mol)	Max VOC Percentage in Gas (wt%)		Max H <sub>2</sub> S (wt%)	Destruction Efficiency on Flare (%)	Hourly Emission Rate <sup>b</sup> (lb/hr)	Annual Emission Rate <sup>c</sup> (T/yr)	Potential to Emit (PTE)	
				VOC	H <sub>2</sub> S						
SEP GAS	0.00	0	21.77	25%	0.02%	98%	0.00	0.00	0.00	0.00	0.0000

<sup>a</sup> During engine maintenance at other downstream sites, the low pressure separator gas at this site may be routed to flare 5% of the year.

<sup>b</sup> Hourly VOC emission rates are calculated as follows:

$$\begin{aligned}
 & (\text{Gas Throughput, MSCF/hr} / (379 \text{ scf/lb-mol}) * (\text{Gas Stream MW, lb/lb-mol}) * (\text{Maximum VOC Percentage in Gas}) * (\text{Destruction Efficiency on Flare}) = (\text{VOC Emissions, lb/hr}) \\
 & (0.00 \text{ MSCF/hr}) / (379 \text{ scf/lb-mol}) * (21.77 \text{ lb/lb-mol}) * (25\%) * (25\%) * (100\% - 98\%) * (1000 \text{ scf/Mscf}) = 0.00 \text{ lb/hr}
 \end{aligned}$$

<sup>c</sup> Annual VOC emission rates are calculated as follows:

$$\begin{aligned}
 & (\text{Gas Throughput at Site, MSCF/yr} / (379 \text{ scf/lb-mol}) * (\text{Gas Stream MW, lb/lb-mol}) * (\text{Max VOC Percentage in Gas}) * (\text{Destruction Efficiency on Flare}) * (1000 \text{ scf/Mscf}) / (2000 \text{ lb/T}) = (\text{VOC Emissio}) \\
 & (0.000 \text{ MSCF/yr}) / (379 \text{ scf/lb-mol}) * (21.77 \text{ lb/lb-mol}) * (25\%) * (25\%) * (100\% - 98\%) * (1000 \text{ scf/Mscf}) / (2000 \text{ lb/T}) = 0.00 \text{ T/yr}
 \end{aligned}$$

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - AOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	Waste Gas Flow Rate			Emission Factors	Units	Potential to Emit Annual <sup>c</sup> (T/yr)
			LHV <sup>a</sup> (Btu/scf)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)			
FL-1	FL-1	Process Flare LP Separator Gas to Flare Event	1,235	0.00	0.00	CO NO <sub>x</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>	lb/MMBtu 0.1380 -- <sup>e</sup>	0.00 0.00 --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	0.00 0.00
								0.00

<sup>a</sup> Waste gas stream lower heating value was taken from inlet gas analysis.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1 follows:

$$\text{CO (lb/hr)} = (\text{Hourly Waste Gas Flow Rate, MMBtu/hr}) * (\text{Emission Factor, lb/MMBtu})$$

$$\text{CO (lb/hr)} = (0.00 \text{ MMBtu/hr}) * 0.2755 \text{ lb/MMBtu}$$

$$= \boxed{0.00} \text{ lb/hr CO}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the tanks to the flare and from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\text{SO}_2 \text{ (lb/hr)} = (\text{Source H}_2\text{S Emission Rate, lb/hr}) * (98\% \text{ captured H}_2\text{S stream}) * (100\% \text{ conversion to SO}_2 \text{ at combustion}) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2)$$

$$\text{SO}_2 \text{ (lb/hr)} = (0.00 \text{ lb/hr H}_2\text{S at Separator Event}) * (98\%) * (100\%) * (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S}) * (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2)$$

$$= \boxed{0.00} \text{ lb/hr SO}_2$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\text{CO (T/yr)} = (\text{Annual Waste Gas Flow Rate, MMBtu/yr}) * (\text{Emission Factor, lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb})$$

$$\text{CO (T/yr)} = \boxed{0.00000 \text{ MMBtu/yr}} * (0.2755 \text{ lb/MMBtu}) * (1 \text{ T} / 2,000 \text{ lb})$$

$$= \boxed{0.00} \text{ T/yr CO}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM LP SEPARATOR - AOS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Max BD Volume (Mscf/hr)</b>	-
<b>Max BD Volume (Mscf/yr)</b>	-
<b>Gas Density (lb/scf)</b>	0.0577

<b>Constituent</b>	<b>Heating Value<sup>a</sup> (Btu/lb)</b>	<b>Inlet Gas Weight (%)</b>	<b>Separator BD Emissions<sup>b</sup></b>		<b>Flare Feed Rate<sup>c</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	55.89%	0.00	0.00	0.00	0.00
Ethane	22,304	17.53%	0.00	0.00	0.00	0.00
Propane	21,646	10.53%	0.00	0.00	0.00	0.00
I-Butane	21,242	2.59%	0.00	0.00	0.00	0.00
N-Butane	21,293	3.98%	0.00	0.00	0.00	0.00
I-Pentane	21,025	1.49%	0.00	0.00	0.00	0.00
N-Pentane	21,072	1.19%	0.00	0.00	0.00	0.00
Cyclopentane	20,350	0.00%	0.00	0.00	0.00	0.00
n-Hexane	20,928	1.70%	0.00	0.00	0.00	0.00
Cyclohexane	20,195	0.00%	0.00	0.00	0.00	0.00
Other Hexanes	20,928	0.00%	0.00	0.00	0.00	0.00
Heptanes	20,825	0.00%	0.00	0.00	0.00	0.00
Octanes	20,747	0.00%	0.00	0.00	0.00	0.00
Nonanes	20,687	0.00%	0.00	0.00	0.00	0.00
Decanes Plus	20,638	0.00%	0.00	0.00	0.00	0.00
Benzene	18,172	0.00%	0.00	0.00	0.00	0.00
Toluene	18,422	0.00%	0.00	0.00	0.00	0.00
Ethylbenzene	18,658	0.00%	0.00	0.00	0.00	0.00
Xylene	18,438	0.00%	0.00	0.00	0.00	0.00
			<b>Totals:</b>	<b>0.00</b>	<b>0.00</b>	

<sup>a</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>b</sup> Constituent Emission Rates were calculated from the known maximum blowdown volumes and density then proportioned using the Inlet Gas stream constituents weight percents. An example calculation for Methane emissions is as follows:

$$\text{Methane (lb/hr)} = \text{Maximum BD Volume (Mscf/hr)} * \text{Gas Density (lb/scf)} * \text{Inlet Gas Weight \%} * 1000$$

$$\text{Methane (lb/hr)} = (0.00 \text{ Mscf/hr}) * (0.0577 \text{ lb/scf}) * 55.89\% * 1,000$$

$$\text{Methane (lb/hr)} = \quad \quad \quad 0.00 \text{ lb/hr}$$

<sup>c</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (0.000.00 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = \quad \quad \quad 0.00 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (0.00 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = \quad \quad \quad 0.00 \text{ MMBtu/yr}$$

CALCULATION OF STORAGE TANK WORKING AND BREATHING POTENTIAL TO EMIT DURING FLARE DOWNTIME - AOS  
 BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 May 30 2013 through May 08 2014  
 BURLINGTON RESOURCES OIL & GAS COMPANY LLP

Variable	Description	Units	Value
$L_T$	total loss = $L_S + L_W$	Ton/yr	See Table
$L_S$	standing loss = $365 Vv Wv Ks Ks$	lb/yr	See Table
$L_W$	working loss = $0.001 Mv Pv Qv Kn Kp$	lb/yr	See Table
$L_u$	working loss = $0.001 Mv Pvmax Qh$	lb/hr	See Table
Roof Construction	Cone		
RVP	Condensate Reid Vapor Pressure	psia	11.64
$\Delta P_b$	Breather vent pressure range	psi	0.06
$I$	Solar insulation factor	Btuft <sup>2</sup> /day	1521
$P_A$	Atmospheric Pressure	psia	14.7
$M_v$	Vapor Molecular Weight	lb/lbmol	36
$T$	Annual Average Temperature	°F	72.1
$T_{AX}$	Daily Maximum Ambient Temperature	°R	541.6
$T_{AN}$	Daily Minimum Ambient Temperature	°R	522.5
$\Delta T_A$	Daily average ambient temperature range	°R	19.1
$K_p$	Product factor		1

Tank Specifications				Material Specifications										VOC										
	V/H	D	H/L	Capacity	Color	$\alpha$	M <sub>v</sub>	Q <sup>*</sup>	P <sub>Max</sub>	Paint Solar Absorbance Factor	Vapor Molecular Weight	Reid Vapor Pressure (psia)	Max. Hourly Storage (bbl/hr)	Daily Vapor Temp. Range °F	H <sub>vo</sub>	T <sub>La</sub> °dry	P <sub>va</sub>	W <sub>v</sub>	$\Delta Pv$	K <sub>e</sub>	K <sub>s</sub>	L <sub>s</sub>	L <sub>r</sub>	L <sub>H</sub>
Material	No. of Tanks	Tank Type	Tank Diameter (ft)	Tank Height/Length (ft)	Tank Capacity (bbl)	Paint Color Conditions	Paint																	
Condensate	6	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	12.454	12.454	0.077440	3.35852	1.5367	0.11	818.56	4.91	0.41	
Slip	1	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	12.454	12.454	0.077440	3.35852	1.5367	0.11	818.56	4.91	0.41	
PW	2	V	12	25	500	Gray	Good	0.54	36	11.64	500	36.75	12.63	539.8	0.033	0.00021	0.02056	0.0662	0.98	0.28	0.002	0.0001		

NOTE: Tank working and breathing emissions are based on the equations found in EPA AP-42 Chapter 7. All factors used are represented in the table on this page. The Condensate Reid Vapor Pressure and Vapor Molecular Weight are determined based on the WinSim condensate stream and Off Gas stream. All other variables are found in AP-42 Chapter 7 or are default unit values.

The emissions shown are due to flare maintenance occurring 2% of the year. During the flare downtime the wellhead would be shut in. Therefore there would be no condensate or produced water liquids flowing to the tanks, however any liquid already in the tanks would remain and have breathing (standing losses) emissions. These emissions would not be controlled, as the flare is down for maintenance. The calculations shown demonstrate this alternative operating scenario regarding flare maintenance and downtime. Based on 2% downtime, this scenario is being shown to occur for 175.2 hours in a year.

As shown on the summary page representing the Tank Emission sent to Flare, HS emissions are represented as occurring when the liquid streams flush during the change from a pressurized flow to the atmospheric tank. Due to the chemical properties of HS, the most conservative approach is to represent that all H<sub>2</sub>S in the liquid will immediately flash, and there will be no HS emitted during working and breathing while the liquids are stored. Since there will be no liquid flow during the flare downtime, there are no flare emissions and therefore no HS emissions from the standing loss of the tanks.

**EMISSIONS FOR MISCELLANEOUS ACTIVITIES (F1N/MSS-FUG)**  
**BARGMANN TRUSTUNI BLAND FRANZ UNIT A1** May 30 2013 through May 08 2014  
**BURLINGTON RESOURCES OIL & GAS COMPANY L.P.**

Emissions Summary			
Pollutant	Hourly Max (lb/hr)	Annual Total (T/yr)	
VOC	5.72	0.16	
H <sub>2</sub> S	0.0004	0.00002	
PM	2.21	1.18	
PM10	0.53	0.28	
PM2.5	0.0001	0.000003	

#	Activity	Description / Comments	Default Parameters	Equation Used	Input Parameters	Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)	Source for "Input Parameters"
1	(b)(1) Engine/Turbine Oil Changes	-Engine has been isolated and blow down occurs prior to oil change. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -The emissions associated with an engine oil filter change occurring during the draining of oil from the engine oil pan or container. -Oil is drained into a 4 ft x 4 ft open pan and transferred to a closed container per Best Management Practice (BMP). -Input parameters based on manufacturer specifications of engine oil SAE 10W (a). -Used a 1380 hp Caterpillar G3516B LE engine (b) as basis for calculation. In order to account for emissions from larger horse power engines, the emissions are doubled. An average engine uses 1.1 gallons of motor oil and manufacturer recommends changing oil every 1000 hrs. We used 10 changes of oil per year as a conservative estimate. -Emission estimates for 1380hp engine are being doubled to be conservative and to accommodate engines with higher hp. -Assume all emissions from opening, loading, and evaporation occur in three separate hours.	Temperature (F) Vapor Pressure (psia) Saturation Factor Molecular Weight (lb/mol) Motor Oil (gal/activity) L <sub>v</sub> winds speed (mph) Vapor Pressure (P <sub>v</sub> , Pa) Molecular Weight (lb/mol) Surface Area A <sub>s</sub> (ft <sup>2</sup> ) (4ft x 4ft) Evaporation time (hrs)	212 0.001 1 500 112 3.52 10 500 1.48 10	Loading Loss L <sub>t</sub> (lb/(1000 gal)) Loading loss per activity (lb/activity)	0.009 0.001 1 0.001 0.001 1.0277	VOC	1.03 0.01	Site-Specific Data
2	(b)(1) & (b)(4) Changing Engine Rod Packings	-Engine has been isolated and blow down occurs prior to changing rod packing. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clamping of the rod would be from clamping of lubricant in the casing. -Casing volume for calculations is based on field observation of casing for a 1380hp G3516B LE engine (b). -Input parameters based on material specifications for AP 101(c) grease. -Assume all emissions from maintenance activity occur in one hour.	Temperature (F) Vapor pressure (psia) Molecular weight (lb-mole) V <sub>v</sub> Casing volume (ft <sup>3</sup> ) (1ft * 3ft) Ideal loss constant (psi-ft <sup>3</sup> lb-mol <sup>-1</sup> -R) Number of activities per year (Number of rod packing changes per year per engine)	104 0.001 500 2.355 10.73 10	Change Loss (lb/activity)	1	VOC 0.0001	0.000001	Site-Specific Data
3	(b)(3) Changing Wet and Dry Seals	-Engine has been isolated and blow down occurs prior to changing seals. The emissions associated with the blow down (106.55 lb (8)) need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clamping of lubricant in the casing. -Casing volume for calculations is based on field observation of casing for a 1380 hp Caterpillar G3516B LE engine (b). -Input parameters based on material specifications for AP 101(c) grease. -Assume all emissions from maintenance activity occur in one hour.	Temperature (F) Vapor pressure of material stored (psia) Molecular weight (lb-mole) V <sub>v</sub> Casing volume (ft <sup>3</sup> ) (1ft * 3ft) Ideal loss constant (psi-ft <sup>3</sup> lb-mol <sup>-1</sup> -R) Number of activities per year (Number of seal changes per year per engine)	104 0.001 500 2.355 10.73 2	Change Loss (lb/activity)	1	VOC 0.0001	0.000001	Site-Specific Data
4	(b)(2) Glycol Dehydration	-Calculations based on physical properties of mono ethylene glycol (MEG(d) because of its low molecular weight and high vapor pressure which gives the most conservative estimate. -Typically the glycol solution used in dehydration unit is not entirely replaced but it is conservatively assumed that the glycol solution is drained once per year for vessel maintenance. -Per field experience 4000 gal of glycol solution is used in a large dehydration unit. -Assume all emissions from opening, loading, and clamping occur in three separate hours.	Temperature (F) Vapor Pressure (psia) Saturation Factor Molecular Weight (lb/mol) Glycol Solution (gal/activity) Temperature (F) Vapor Pressure (psia) Molecular Weight (lb/mol) V <sub>v</sub> Vessel volume (ft <sup>3</sup> ) (5 ft radii * 30 ft height) Ideal loss constant (psi-ft <sup>3</sup> lb-mol <sup>-1</sup> -R) Number of activities per year	68 0.001 1 62.07 4000 68 0.001 63.07 2.355 10.73 1	Loading Loss L <sub>t</sub> (lb/(1000 gal)) Loading loss per activity (lb/activity)	0.0015 0.0060 0.0155 0.001 63.07 2.355 10.73 Total (lb/year/unit)	0 VOC 0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Site-Specific Data



**EMISSIONS FOR MISCELLANEOUS ACTIVITIES (FINMSS-FUG)**  
**BARGMANN TRUSTUNI BLAND FRANZ UNIT A1 May 30 2013 through May 08 2014**

14a	(b) Coating Activities		-If use less than 100 gal/yr coating and less than 50 gal/yr of solvent, activity is De Minimis			Site-Specific Data		
	-Assume max VOC content is allowed by 30 TAC 11.5, i.e., 3.5 lb/gal.			Maximum Hourly Coating usage rate (gal/hr-gal)	5	Maximum Hourly Emissions (lb/hr)	17.500	
	Emission calculation formula and emission factors are defined in TCEQ Technical Guidance Document for Surface Coating Operations dated April 2001.			Maximum Annual Coating usage rate (gal/yr-gal)	99			
	-The calculations do not account for any enclosure or control device.			Number of guns with concurrent coating	1	Maximum Annual Emissions (T/yr)	0.173	
14b	(b) Coating (spray)	-If use less than 100 gal/yr coating and less than 50 gal/yr of solvent, activity is De Minimis	Maximum hourly coating usage rate (gal/hr-gal)	5	Maximum Hourly Emissions (lb/hr)	4.543	PM10	0.00
		-Emission calculation method and emission factors are defined in TCEQ Technical Guidance Document for Surface Coating Operations dated April 2001.	Maximum annual coating usage rate (gal/yr-gal)	99			PM	0.00
		-It is assumed that 90% of the overspray fails to the ground per TCEQ Memo dated January 10, 1994.	Max Density (lb/gal)	23	Maximum Annual Emissions (T/yr)	0.040		
		-All PM is assumed to be PM and PM10 (i.e., no particle size distribution is applied).	Percent Overspray for PM (%)	50.00%				
15	(b) Pigging Activities	-Based on an estimate of 50 scf of gas being degassed per event at 900 psi	Volume degassed (at pressure) (scf)	0	Volume degassed (at pressure) (scf)	0.00	VOC	0.00
		-Assume all emissions from maintenance activity occur in one hour.	Pressure at which stream is degassed (psi)	900			H <sub>2</sub> S	0.00
			Air Molecular Weight (lb/lbmol)	28.96	Stream Specific Gravity	0.752		
			Molar volume conversion (scf/(lb/mol))	379.4	Stream Density (lb/scf)	0.057		
			Initial stream VOC content (%)	25.00%				
			Initial stream H <sub>2</sub> S content (%)	0.02%				
			Type of Control Equipment					
			Control Efficiency (%)	0.00%				
			Events per Hour	1				
			Events per Year	52				
16	(b) Condensate Tank Cleaning Activities	-For condensate tanks and storage vessels	P <sub>v</sub> vapor pressure of material (psia)	11.64	N <sub>v</sub> , volume of vessel (ft <sup>3</sup> )	2897.49	Number of Condensate Tanks	7
		-Assumed drained material is immediately placed in a closed vessel. To be conservative, this time is represented as 15 minutes	Vessel Height (ft)	25			H <sub>2</sub> S	0.00004
		-Assumes an average daily temperature of 95F, per TCEQ guidance.	Vessel Diameter (ft)	12				0.00002
		-Assume all emissions from opening, loading, and evaporation occur in three separate hours.	Vessel Volume (ft <sup>3</sup> )	500				
			Average Daily Temperature (F)	72.1	L <sub>o</sub> , opening loss (lb/activity)	206.05		
			Ideal gas constant (psi-ft <sup>3</sup> /lb-mol-R)	10.73				
			NMW, vapor molecular weight (lb/lbmol)	36	Loading loss factor (lb/1000 gal loaded)	5.89		
			Saturation Factor	0.60	V <sub>l</sub> , volume of liquid drained (gal/activity)	210.00		
			U <sub>l</sub> wind speed (mph)	3.52	Loading loss per activity (due to draining) (lb/activity)	1.24		
			Surface Area Ap (m <sup>2</sup> )	1	Vapor Pressure P <sub>v</sub> (Pa)	8025.501		
			U <sub>l</sub> time material sits uncovered (hr)	0.25	Evaporation Loss (lb/activity)	24.46		
			Condensate stream H <sub>2</sub> S content (%)	0.01%				
			Type of Control Equipment					
			Control Efficiency (%) (for opening losses only)	98.00%				
			Events per Hour per tank	1	Total (lb/year/tank)	231.75		
			Events per Year/tank	1				
17	(b) Non-Condensate Tank Cleaning Activities	-For non-condensate tanks and storage vessels	P <sub>v</sub> vapor pressure of material (psia)	0.116	N <sub>v</sub> , volume of vessel (ft <sup>3</sup> )	2897.49	Number of Non-Condensate Tanks	2
		-Assumed drained material is immediately placed in a closed vessel. To be conservative, this time is represented as 15 minutes	Vessel Height (ft)	25			H <sub>2</sub> S	0.00005
		-Assumes an average daily temperature of 95F, per TCEQ guidance.	Vessel Diameter (ft)	12				0.000001
		-Assume all emissions from opening, loading, and evaporation occur in three separate hours.	Vessel Volume (ft <sup>3</sup> )	500				
			Average Daily Temperature (F)	72.1	L <sub>o</sub> , opening loss (lb/activity)	2.053		
			Ideal gas constant (psi-ft <sup>3</sup> /lb-mol-R)	10.73				
			NMW, vapor molecular weight (lb/lbmol)	36	Loading loss factor (lb/1000 gal loaded)	0.58667		
			Saturation Factor	0.60	V <sub>l</sub> , volume of liquid drained (gal/activity)	210.00		
			U <sub>l</sub> wind speed (mph)	3.52	Loading loss per activity (due to draining) (lb/activity)	0.0132		
			Surface Area Ap (m <sup>2</sup> )	1	Vapor Pressure P <sub>v</sub> (Pa)	79.39		
			U <sub>l</sub> time material sits uncovered (hr)	0.25	Evaporation Loss (lb/activity)	0.244		
			Produced Water Stream H <sub>2</sub> S Content (%)	0.02%				
			Type of Control Equipment					
			Control Efficiency (%)	98.00%				
			Events per Hour per tank	1	Total (lb/year/tank)	2.369		
			Events per Year/tank	1				

Note: The emissions from the MSS Activities presented above are determined using equations and applicable default values presented by the TCEQ in 106.359(b), as well as equations from AP-42. Blowdown emissions (§106.359(b)(8)) are accounted for on a separate page when applicable.

**CALCULATION OF COMPRESSOR ENGINE STARTER VENT POTENTIAL TO EMIT- MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Description</b>	<b>Facility Identification Number</b>
	<b>COMP-01-SV</b>
Number of Engine Starts per Year	52
Number of Engine Starts per Hour	1
Start Volume per Event, scf	900
Fuel Stream Specific Gravity	0.7548
Fuel Stream Density, lb/scf <sup>a</sup>	0.058
VOC Percentage in Fuel Stream, wt%	25%
Max H <sub>2</sub> S Percentage in Fuel Stream, wt%	0.02%
<hr/>	
VOC Hourly Emission Rates (lb/hr): <sup>b</sup>	13.05
VOC Annual Emission Rates (T/yr): <sup>c</sup>	0.34
<hr/>	
H <sub>2</sub> S Hourly Emission Rates (lb/hr): <sup>b</sup>	0.01
H <sub>2</sub> S Annual Emission Rates (T/yr): <sup>c</sup>	0.0003
<hr/>	

<sup>a</sup> Gas stream density is calculated as follows:

$$(28.96 \text{ lb/mole}) / (379 \text{ scf/mole}) * (0.7548) = 0.058 \text{ lb/scf}$$

<sup>b</sup> Hourly starter vent VOC and H<sub>2</sub>S emissions are calculated based upon a conservative estimate of the portion of each constituent in the volume known to blow down from the engine source. An example calculation for VOC for COMP-01-SV is as follows:

$$\text{VOC lb/hr} = (1 \text{ startup/hr}) * (900 \text{ scf/startup}) * (0.058 \text{ lb/scf}) * (25.00\%) = 13.05 \text{ lb/hr}$$

<sup>c</sup> Annual starter VOC emission rates are calculated as follows:

$$\text{VOC lb/hr} = (52 \text{ startups/yr}) * (900 \text{ scf/startup}) * (0.058 \text{ lb/scf}) * (25.00\%) / (2,000 \text{ lb/T}) = 0.34 \text{ T/yr}$$

**CALCULATION OF COMPRESSOR ENGINE BLOWDOWN POTENTIAL TO EMIT - MSS****BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014****BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Description</b>	<b>Facility Identification Number</b>
<b>COMP-01-BD</b>	
Number of Blowdowns per Year	52
Number of Blowdowns per Hour	1
Blowdown Volume per Event, scf	410
Gas Stream Specific Gravity	0.7548
Gas Stream Density, lb/scf <sup>a</sup>	0.058
Max VOC Percentage in Gas Stream, wt%	25%
Max H <sub>2</sub> S Percentage in Gas Stream, wt%	0.02%
VOC Hourly Emission Rates (lb/hr): <sup>b</sup>	5.95
VOC Annual Emission Rates (T/yr): <sup>c</sup>	0.15
H <sub>2</sub> S Hourly Emission Rates (lb/hr): <sup>b</sup>	0.005
H <sub>2</sub> S Annual Emission Rates (T/yr): <sup>c</sup>	0.0001
Controlled VOC Hourly Emission Rates (lb/hr)	0.12
Controlled VOC Annual Emission Rates (T/yr):	0.003
Controlled H <sub>2</sub> S Hourly Emission Rates (lb/hr)	0.0001
Controlled H <sub>2</sub> S Annual Emission Rates (T/yr):	0.000002

<sup>a</sup> Gas stream density is calculated as follows:

$$(28.96 \text{ lb/mole}) / (379 \text{ scf/mole}) * (0.7548) = 0.058 \text{ lb/scf}$$

<sup>b</sup> Hourly controlled blowdown VOC and H<sub>2</sub>S emissions are calculated based upon a conservative estimate of the portion of each constituent in the volume known to blow down from the engine source. An example calculation for VOC for COMP-01-BD is as follows:

$$\text{VOC lb/hr} = (1 \text{ blowdown/hr}) * (410 \text{ scf/blowdown}) * (0.058 \text{ lb/scf}) * (25.00\% \text{ VOC in Stream}) * (100\% - 98\% \text{ controlled at flare}) = 5.95 \text{ lb/hr}$$

<sup>c</sup> Annual controlled blowdown VOC emission rates are calculated as follows:

$$\text{VOC lb/hr} = (52 \text{ blowdowns/yr}) * (410 \text{ scf/blowdown}) * (0.058 \text{ lb/scf}) * (25.00\%) / (2,000 \text{ lb/T}) * (100\% - 98\% \text{ controlled at flare}) = 0.15 \text{ T/yr}$$

**PROCESS FLARE WASTE GAS COMBUSTION EMISSIONS - MSS**

BARGMANN TRUST UNIT BI AND FRANZ UNIT A1 May 30 2013 through May 08 2014

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

EPN	FIN	Description	LHV <sup>a</sup> (Btu/srf)	Waste Gas Flow Rate		Emission Factors	Units	Hourly <sup>b</sup> (lb/hr)	Annual <sup>c</sup> (T/yr)
				Hourly (MMBtu/hr)	Annual (MMBtu/yr)				
FL-1-MSS	FL-1-MSS	Process Flare Compressor Blowdown Gas to Flare Event	1,235	0.51	26.38	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.14 0.07 --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	-- <sup>c</sup> -- <sup>c</sup>	0.01 0.0001
FL-1-MSS	FL-1-MSS	Process Flare Condensate and Slop Tank Cleaning Activities	1,890	6.98	67.91	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	1.92 0.56 --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	-- <sup>c</sup> -- <sup>c</sup>	0.0002 0.0001
FL-1-MSS	FL-1-MSS	Process Flare Produced Water Tank Cleaning Activities	1,869	0.08	0.23	CO NO <sub>x</sub> PM/PM <sub>w</sub> /PM <sub>2.5</sub>	0.2755 0.1380 -- <sup>e</sup>	lb/MMBtu lb/MMBtu --	0.0003 0.0002 --
						SO <sub>2</sub> H <sub>2</sub> S	-- <sup>c</sup> -- <sup>c</sup>	-- <sup>c</sup> -- <sup>c</sup>	0.00001 0.000002

<sup>a</sup> Waste gas stream lower heating value was taken from the inlet gas analysis.

<sup>b</sup> Emission Factors for CO and NO<sub>x</sub> are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for EPN FL-1-MSS follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Hourly Waste Gas Flow Rate, MMBtu/hr})^{\ast} (\text{Emission Factor, lb/MMBtu}) \\ &= \frac{(0.51 \text{ MMBtu/hr})(0.2755 \text{ lb/MMBtu})}{0.14 \text{ lb/hr CO}} \end{aligned}$$

<sup>c</sup> H<sub>2</sub>S emissions are routed from the separator to the flare and then converted to SO<sub>2</sub>. To be most conservative, SO<sub>2</sub> emission rates were determined based on the combustion efficiency of 100% H<sub>2</sub>S converted to SO<sub>2</sub>. H<sub>2</sub>S emitted at the flare is 2% of the captured stream not converted by combustion. An example calculation for hourly SO<sub>2</sub> emissions for EPN FL-1 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= (\text{Source H}_2\text{S Emission Rate, lb/hr})^{\ast} (98\% \text{ captured H}_2\text{S stream})^{\ast} (100\% \text{ conversion to SO}_2 \text{ at combustion})^{\ast} (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S})^{\ast} (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2) \\ \text{SO}_2 \text{ (lb/hr)} &= \frac{(0.01 \text{ lb/hr H}_2\text{S from Blowdown Event})^{\ast} (98\%)^{\ast} (100\%)^{\ast} (1 \text{ mol H}_2\text{S}/34.07 \text{ lb H}_2\text{S})^{\ast} (64.06 \text{ lb SO}_2/1 \text{ mol SO}_2)}{0.01 \text{ lb/hr SO}_2} \end{aligned}$$

<sup>d</sup> An example calculation for annual CO emissions for EPN FL-1 follows:

$$\begin{aligned} \text{CO (Tyr)} &= (\text{Annual Waste Gas Flow Rate, MMBtu/yr})^{\ast} (\text{Emission Factor, lb/MMBtu})^{\ast} (1 \text{ T} / 2,000 \text{ lb}) \\ \text{CO (Tyr)} &= \frac{(26.38 \text{ MMBtu/yr})^{\ast} (0.2755 \text{ lb/MMBtu})^{\ast} (1 \text{ T} / 2,000 \text{ lb})}{0.004 \text{ Tyr CO}} \end{aligned}$$

<sup>e</sup> The process flares are smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible.

**CALCULATION OF FLARE FEED RATES FROM ENGINE BLOWDOWN - MSS**  
**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**  
**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

<b>Max Engine BD Volume (Mscf/hr)</b>	0.41
<b>Max Engine BD Volume (Mscf/yr)</b>	21
<b>Gas Density (lb/scf)</b>	0.0580

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<b>Constituent</b>	<b>Heating Value<sup>a</sup> (Btu/lb)</b>	<b>Inlet Gas Weight (%)</b>	<b>Engine BD Emissions<sup>b</sup></b>		<b>Flare Feed Rate<sup>c</sup></b>	
			<b>Hourly (lb/hr)</b>	<b>Annual (T/yr)</b>	<b>Hourly (MMBtu/hr)</b>	<b>Annual (MMBtu/yr)</b>
Methane	23,861	55.89%	13.29	0.34	0.31	16.06
Ethane	22,304	17.53%	4.17	0.11	0.09	4.86
Propane	21,646	10.53%	2.50	0.06	0.05	2.57
I-Butane	21,242	2.59%	0.62	0.02	0.01	0.83
N-Butane	21,293	3.98%	0.95	0.02	0.02	0.83
I-Pentane	21,025	1.49%	0.35	0.01	0.01	0.41
N-Pentane	21,072	1.19%	0.28	0.01	0.01	0.41
Cyclopentane	20,350	0.00%	0.00	0.00	0.00	0.00
n-Hexane	20,928	1.70%	0.40	0.01	0.01	0.41
Cyclohexane	20,195	0.00%	0.00	0.00	0.00	0.00
Other Hexanes	20,928	0.00%	0.00	0.00	0.00	0.00
Heptanes	20,825	0.00%	0.00	0.00	0.00	0.00
Octanes	20,747	0.00%	0.00	0.00	0.00	0.00
Nonanes	20,687	0.00%	0.00	0.00	0.00	0.00
Decanes Plus	20,638	0.00%	0.00	0.00	0.00	0.00
Benzene	18,172	0.00%	0.00	0.00	0.00	0.00
Toluene	18,422	0.00%	0.00	0.00	0.00	0.00
Ethylbenzene	18,658	0.00%	0.00	0.00	0.00	0.00
Xylene	18,438	0.00%	0.00	0.00	0.00	0.00
			<b>Totals:</b>	<b>0.51</b>	<b>26.38</b>	

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<sup>a</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>b</sup> Constituent Emission Rates were calculated from the known maximum blowdown volumes and density then proportioned using the Inlet Gas stream constituents weight percents. An example calculation for Methane emissions is as follows:

$$\begin{aligned} \text{Methane (lb/hr)} &= \text{Maximum BD Volume (Mscf/hr)} * \text{Gas Density (lb/scf)} * \text{Inlet Gas Weight \%} * 1000 \\ \text{Methane (lb/hr)} &= (0.41 \text{ Mscf/hr}) * (0.0580 \text{ lb/scf}) * 55.89\% * 1,000 \\ \text{Methane (lb/hr)} &= 13.29 \text{ lb/hr} \end{aligned}$$

<sup>c</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\begin{aligned} \text{MMBtu/hr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/hr Methane} &= (23,861 \text{ Btu/lb}) * (13.29 \text{ lb/hr}) * 99\% / (10^6) \\ \text{MMBtu/hr Methane} &= 0.31 \text{ MMBtu/hr} \end{aligned}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\begin{aligned} \text{MMBtu/yr Methane} &= \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6 \\ \text{MMBtu/yr Methane} &= (23,861 \text{ Btu/lb}) * (0.34 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6) \\ \text{MMBtu/yr Methane} &= 16.06 \text{ MMBtu/yr} \end{aligned}$$

**CALCULATION OF FLARE FEED RATES FROM CONDENSATE AND SLOP TANK CLEANING ACTIVITIES - MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**MSS Condensate and Slop Tank Clean Out Total Emissions<sup>a</sup>**

VOC Emissions (lb/hr):	206.00
VOC Emissions (TPY):	1.00
Hydrocarbon Emissions (lb/hr):	330.34
Hydrocarbon Emissions (TPY):	1.60

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Condensate Tanks Flash Gas Weight (%)	MSS Condensate and Slop Tank Cleaning Activities Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	13.26%	43.80	0.21	1.03	9.92
Ethane	22,304	22.39%	73.96	0.36	1.63	15.90
Propane	21,646	24.11%	79.64	0.39	1.71	16.72
I-Butane	21,242	7.38%	24.38	0.12	0.51	5.00
N-Butane	21,293	13.05%	43.11	0.21	0.90	8.76
I-Pentane	21,025	5.39%	17.81	0.09	0.37	3.71
N-Pentane	21,072	4.61%	15.23	0.07	0.31	2.89
Cyclopentane	20,350	0.31%	1.02	0.005	0.02	0.20
n-Hexane	20,928	1.51%	4.99	0.02	0.10	0.82
Cyclohexane	20,195	0.34%	1.12	0.01	0.02	0.40
Other Hexanes	20,928	2.78%	9.18	0.04	0.19	1.64
Heptanes	20,825	1.47%	4.86	0.02	0.10	0.82
Octanes	20,747	0.48%	1.59	0.01	0.03	0.41
Nonanes	20,687	0.13%	0.43	0.002	0.01	0.08
Decanes Plus	20,638	0.07%	0.23	0.001	0.005	0.04
Benzene	18,172	0.19%	0.63	0.003	0.01	0.11
Toluene	18,422	0.33%	1.09	0.01	0.02	0.36
Ethylbenzene	18,658	0.03%	0.10	0.0005	0.002	0.02
Xylene	18,438	0.18%	0.59	0.003	0.01	0.11
VOC		62.36%			<b>Total: 6.98</b>	
			<b>67.91</b>			

<sup>a</sup> Total VOC Emissions were determined by adding the MSS Condensate and Slop Clean Out Stream. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (206.00 \text{ lb/hr}) * (1 / 62.36\%)$$

$$\text{Total HC (lb/hr)} = 330.34 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Condensate Flash Gas stream constituents weight percents, generated by the WinSim program.

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (43.80 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 1.03 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (0.21 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 9.92 \text{ MMBtu/yr}$$

**CALCULATION OF FLARE FEED RATES FROM PRODUCED WATER TANK CLEANING ACTIVITIES - MSS**

**BARGMANN TRUST UNIT B1 AND FRANZ UNIT A1 May 30 2013 through May 08 2014**

**BURLINGTON RESOURCES OIL & GAS COMPANY LP**

**MSS Produced Water Tank Clean Out Total Emissions:<sup>a</sup>**

VOC Emissions (lb/hr):	2.00
VOC Emissions (TPY):	0.003
Hydrocarbon Emissions (lb/hr):	3.19
Hydrocarbon Emissions (TPY):	0.005

Constituent	Heating Value <sup>b</sup> (Btu/lb)	Produced Water Tanks Flash Gas Weight (%)	MSS Produced Water Tank Cleaning Activities Emissions <sup>c</sup>		Flare Feed Rate <sup>d</sup>	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)
Methane	23,861	12.96%	0.41	0.001	0.01	0.05
Ethane	22,304	22.15%	0.71	0.001	0.02	0.04
Propane	21,646	24.03%	0.77	0.001	0.02	0.04
I-Butane	21,242	7.46%	0.24	0.0004	0.005	0.02
N-Butane	21,293	13.18%	0.42	0.001	0.01	0.04
I-Pentane	21,025	5.44%	0.17	0.0003	0.004	0.01
N-Pentane	21,072	4.65%	0.15	0.0002	0.003	0.01
Cyclopentane	20,350	0.32%	0.01	0.00002	0.0002	0.001
n-Hexane	20,928	1.52%	0.05	0.0001	0.001	0.004
Cyclohexane	20,195	0.34%	0.01	0.00002	0.0002	0.001
Other Hexanes	20,928	2.81%	0.09	0.0001	0.002	0.004
Heptanes	20,825	1.48%	0.05	0.0001	0.001	0.004
Octanes	20,747	0.48%	0.02	0.00002	0.0004	0.001
Nonanes	20,687	0.13%	0.004	0.00001	0.0001	0.0004
Decanes Plus	20,638	0.08%	0.003	0.000004	0.0001	0.0002
Benzene	18,172	0.19%	0.01	0.00001	0.0002	0.0004
Toluene	18,422	0.33%	0.01	0.00002	0.0002	0.001
Ethylbenzene	18,658	0.03%	0.001	0.000002	0.00002	0.0001
Xylene	18,438	0.18%	0.01	0.00001	0.0002	0.0004
VOC		62.65%				
<b>Total:</b>					<b>0.08</b>	<b>0.23</b>

<sup>a</sup> Total VOC Emissions were determined by adding the MSS Produced Water Clean Out Stream. Total Hydrocarbon Emissions were calculated as follows:

$$\text{Total HC (lb/hr)} = \text{VOC Emissions (lb/hr)} * (1 / \text{VOC\% of stream})$$

$$\text{Total HC (lb/hr)} = (2.00 \text{ lb/hr}) * (1 / 62.65\%)$$

$$\text{Total HC (lb/hr)} = 3.19 \text{ lb/hr}$$

<sup>b</sup> Heating values taken from Perry's Chemical Engineers' Handbook , Table 3-207 (pg. 3-155)

<sup>c</sup> Emission Rates were proportioned from the Total Hydrocarbon Emissions using the Produced Water Flash Gas stream constituents weight percents, generated by the WinSim

<sup>d</sup> An example calculation for the hourly flare feed rate for Methane is demonstrated. Note that constituents with greater than 3 carbons use 98% destruction efficiency.

$$\text{MMBtu/hr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Hourly Methane Emissions (lb/hr)} * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/hr Methane} = (23,861 \text{ Btu/lb}) * (0.41 \text{ lb/hr}) * 99\% / (10^6)$$

$$\text{MMBtu/hr Methane} = 0.01 \text{ MMBtu/hr}$$

An example calculation for the annual flare feed rate for Methane is demonstrated.

$$\text{MMBtu/yr Methane} = \text{Methane Heating Value (Btu/lb)} * \text{Annual Methane Emissions (T/yr)} * (2,000 \text{ lb/T}) * 99\% \text{ of stream is combusted} / 10^6$$

$$\text{MMBtu/yr Methane} = (23,861 \text{ Btu/lb}) * (0.0010 \text{ T/yr}) * (2,000 \text{ lb/T}) * 99\% / (10^6)$$

$$\text{MMBtu/yr Methane} = 0.05 \text{ MMBtu/yr}$$